Vietnam: A Reconstitution of its 20th Centuty Population History

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Introduction

Estimating Vietnamese population over the 20th century is a difficult challenge for more than one reason. First, there is the lack of data. Like many developing countries, Vietnam has set up a vital registration and census administration, step by step, in a process that has taken all of the 20th century. Started at the beginning of the century, data collection reached some kind of satisfying level in the 1930s, when WWII and the liberation wars interrupted its development until the late 1970s. At that time vital registration and, particularly, the census organisation were remodelled by international standards. As a result, Vietnam's demographic data diverge considerably, both in its availability and in its inner structure.

Other difficulties have political backgrounds. Before WWII demographic data collection was organised by the French administration It relied on local authorities, that were more than suspicious about it. There is no doubt data quality suffered from this resistance. After the departure of the French administration, in 1955, and until the end of the American war in 1975, data collection, as far as it continued, was organised separately in the North and in the South, and demographic indicators were used as arguments in the ideological confrontation between the two parts of the country. Even in the late 1970s data may be suspected to be ideologically biased. It is not before the 1980s, when the Renovation movement sweeps away many socialist ideas and practices in Vietnam's society, economy and administration, that demographic data is collected and published using scientific methods and international standards.

A last difficulty comes from the demographic evolution itself. In 1989, Vietnam has accomplished part of the mortality transition and started its fertility transition. So far, it follows a well-known pattern of many developing countries. But Vietnam knew many exceptional events that disturbed this pattern: two world wars and two liberation wars, a major famine in 1944-1945 and an important out-migration flow after 1975. These events have influenced Vietnam's demographic history at levels that are not always well known.

Facing such difficulties, we cannot aim to reconstitute exactly Vietnam's demographic 20th century history. What we may try is to figure out a model that combines all available information and that fits as well as possible to all of this at the time. If, moreover, this model is demographically consistent, then we may accept it as a stylised version of real Vietnamese 20th century demographic history.

PART I : Data sources and previous estimates

It took Vietnam about one hundred years to achieve modern population censuses, picturing in more or less detail Vietnam's demographic situation. Indeed, if the 1979 and 1989 censuses are generally presumed to be the first reliable censuses, especially the 1989 census, they are the endpoint of a long process of data production that started in the 19th century and took a special but temporary highlight in the 1920s and 1930s. We will briefly describe the different stages of this story.

Population censuses

As soon as the Indochina peninsula came under French control - in the 1860s for Cochinchina, in the 1880s for Tonkin, Annam conserving some kind of self-government - French authorities strove for population figures. Local native authorities were charged with estimating the population they controlled. The first estimates were as early as 1886 : 6.2 million for Tonkin and 1.8 million for Cochinchina (Gourou 1936: 179 ; Annuaire de la Cochinchine 1888 : 488). But from the outset, those who were supposed to carry them out regarded these operations with suspicion. Brenier (1914: 8): "Any survey of this kind is considered as a preliminary measure for tax increase, and it meets resistance that is very hard

to break because of the nearby absolute autonomy of the communities."[1] The tax contribution of each village was calculated on the number of males seventeen years of age and over, registered on tax lists. These lists were known to be understated, so local authorities feared, not without reason, that census results could mark up the tax lists and thereby the total tax contribution. Communities' hostility towards census efforts remained strong throughout the French period. Twenty years after Brenier, Pierre Gourou (1936) states : "It is certain that the villages do their very best to hide exact figures."[2] Analysing several local population series, he concludes : "It is no use to continue the demonstration that the official data have been established with too much fantasy to allow any right idea of population's evolution."[3]

In spite of the deeply rooted suspicion among local authorities, the French administration sets up modern population censuses. The 1921 census is the first national wide census on the household level, but the data information is still controlled by local authorities. The 1931 census is the second, and last one until 1979. Each community collects information on the number of families, its members and their relationships, their sex and age (3 age groups only), matrimonial and professional situation, nationality, school attendance, etc. Special attention is paid to avoid male adult identification in order to limit tax-motivated under-enumeration. Yet, under-enumeration is thought to be evident. The 1921 Annam census results turn out so low that they are arbitrarily inflated by 18% for each community of the Annam region. But even then, "though they have been majored already, the actual figures certainly are still below reality (maybe for more than 10%)."[4] Cochinchina and Tonkin are considered to be more reliable, but nonetheless, Gourou (1936 : 144) estimates under-enumeration in Tonkin at 5 to 15%.

Other evaluations take place in 1926, 1936 and 1943, but they are only "very rough evaluations"[5] of local authorities on the base of the preceding censuses. After 1945, several more evaluations are published but by that time part of the Vietnamese territory is out of French control. Published data are split up in controlled and uncontrolled areas, making totals useless for a national reconstitution.

The two modern censuses, in 1979 and 1989, have been organised with international technical and financial support. Yet, the results of the 1979 census have been found to be of poor quality by numerous analysts (Banister 1985 and 1993, Merli 1998). The 1989 census is generally considered to be more reliable, but we will see below that the vital information collected for the 5% sample survey, organised as part of the census, shows very serious underreporting of vital events. Deaths, which occurred in the household over the previous 12 months, seem to have been under-reported for about 50%. If records on main recent events are so far from complete for the 5% sample that is supposed to be a high quality survey, then the general information collected in the overall census cannot be considered as totally reliable. Nevertheless, up to now it is the best census we have at our disposal.

Vital registration

Birth and death registration is introduced by the French administration throughout Indochina, and reinforced in 1906 and 1924 (Gourou 1936 : 177). But still, in 1927, the Central Government admits: "vital registration exists all over Indochina for the Europeans, in practice in Cochinchina only for natives."[6]

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[1] Brenier (1914) : 8. "Toute enquête de cet ordre est considérée comme une mesure préliminaire à une augmentation d'impôt, et rencontre des résistances que l'autonomie à peu près absolue de la commune rend très malaisé de rompre."

[2] Gourou (1936) : 176. "Il est certain que les villages mettent la plus grande mauvaise volonté à donner des chiffres exacts."

[3] Gourou (1936) : 179. "Il est inutile d'insister plus longuement pour montrer que les statistiques officielles sont établies avec trop de fantaisie pour pouvoir donner une idée juste de l'évolution de la population."

[4] Annuaire Statistique de l'Indochine, vol. 1, 1913-1922 (1927) : 28-29. "au total, et bien qu'ils soient le résultat d'une première majoration, les chiffres actuels sont sans doute encore inférieurs à la réalité (peut-être de plus de 10 pour cent)."

[5] Annuaire Statistique de l'Indochine, vol. 2, p. 60

[6] Annuaire Statistique de l'Indochine, vol. 1, p. 29

As Gourou analyses birth and death registration in Tonkin in the 1930s, he observes : "Whereas we count in the hospital [of Hanoi] 112 male births for 100 female, home births count 171 male for 100 female. Naturally, vital registration is worse in the villages than it is in Hanoi."[7] On the basis of collected data from selected communities, re-evaluated for female birth under-registration, Gourou concludes : "The birth rate would be 34 for 1000, the death rate 14 for 1000... Of course, none of these figures [is] exact. We may be sure that real birth rates ... reach the highest levels observed in the world. Obviously, mortality ... may have been double of the value we obtained."[8]

It is interesting to notice that 60 years later, the Central Census Steering Committee (1991) suggests exactly the same correction for the number of deaths reported at the 5% sample survey of the 1989 census. Mere coincidence? Of course. But we retain the general idea of a very insufficient death registration throughout the century. No reasonable correction factor (1.5 ? ; 2 ? ; 2.5 ?) can be chosen for colonial Vietnam and this takes away the usefulness of those sparse statistics, concerning some territories and some early periods, published in the Annuaires and picked up by various researchers.[9] Exception should be made for Cochinchina (see below) and for some local survey results.

Local surveys

The first survey took place in the Hanoi-Namdinh area, in 1910-1912, and was conducted by Dr. Tedeschi[10] among 20,000 peasants. It stated a birth rate of 42 for 1000 and a death rate of 28 for 1000. In the early 1930s, Gourou (1936) collected data for Catholic communities and came to a 37 for 1000 birth rate and a 19 for 1000 death rate. However, he warned : "Though these demographic data are certainly among the best we have at our disposal up until now, we must nonetheless judge the death rate too low."[11]

More recently, other health surveys and indirect sources have shed more light on Vietnam's demographic fundamentals (National Committee for Population and Family Planning 1988, Central Census Steering Committee 1991, Banister 1985, 1993, Hirschman et al. 1995, Merli 1997, 1998). We will comment their findings more in detail after some concluding remarks on colonial Cochinchina.

The Cochinchina exception

Right from the beginning, Cochinchina holds a special place in the French administration of Indochina. In the French colonial architecture, it is a "colony", whereas Annam and Tonkin are "protectorates", revealing different degrees of administration involvement. Therefore, vital registration is supposed to be better organised and more reliable. As a first consequence, vital statistics for the Asian population of Cochinchina are published throughout the 1914-1939 period. As a second consequence, these statistics seem, after analysis, of rather good quality, although some questions persist.

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[7] Gourou 1936 : 177. "Tandis que, à l'hôpital, on compte 112 naissances masculines pour 100 naissances féminines, les naissances à domicile comprennent 171 des premières contre 100 des secondes. Bien entendu, dans les villages l'état civil fonctionne encore plus mal qu'à Hanoi."
Gourou has re-evaluated total births on the base of a 112 masculinity rate, in spite of its unusual value. If this rate were true - obtained by means we don't know of - it would have had important consequences for the reconstitution of Vietnam's sex structure. Fortunately, we dispose of more detailed data, showing a 105.7 masculinity rate for 1928-1937 Hanoi hospitals, 117.3 for private clinics, and 177.3 for home births (Bulletin économique de l'Indochine, 1938 : 611). So, we consider that, in spite of the son preference that Vietnam families demonstrate even long before fertility control, the masculinity rate have been 'normal' (104.92) all over the reconstituted period, modern son preference methods being influent only after 1989 (see Haughton and Haughton, 1995 and 1996).

[8] Gourou 1936 : 185. "Le taux de natalité serait de 34 pour 1000, celui de la mortalité de 14 pour 1000... Certes, aucun de ces chiffres [n'est] exact. On peut être assuré que la natalité réelle ... atteint les plus hauts maxima observés dans le monde. Il est bien évident que la mortalité ... atteint peut-être le double du pourcentage que nous avons obtenu."

[9] Smolski 1929 ; Gourou 1936 ; Ng 1974 ; Jones 1982 ; Banister 1993.

[10] Brenier 1914 : 9.

[11] Gourou 1936 : 193. "Ces données démographiques sont certainement parmi les meilleures dont nous disposions à l'heure actuelle. On doit cependant penser que le taux de mortalité est trop faible."

The most satisfying indicator is given by the stillbirths. From 1934 through 1940, the ratio stillbirths/live births goes from about 3.7 to about 3.2% (see table 8 in appendix). Moreover, male stillbirth ratios are very close to female ratios. Both are indications for complete or close to complete birth registration. Yet, the male/female ratio of live births looks much less satisfying. From 1915 through 1937, it is constantly between 1.16 and 1.19. Much more plausible than the 1.71 ratio reported by Gourou for home births in Hanoi, it still is too high (see note 7). It indicates female births under-registration in a son-preference cultural setting.

Female birth under-registration of 10 to 20% seems likely, bringing total birth under-registration at 5 to 10%, which is comparable to the under-enumeration estimates for the census population. The uncorrected birth rates should then be very close to its real value. From 1928 through 1937, Cochinchina's birth rate holds between 35 and 38 for 1000, with a mean rate of 36.3 for 1000. This is very close to the 37 for 1000 estimated by Gourou for Tonkin at that time, based on the Catholic registers. Holding this as the pre-WW2 birth rate level is a reasonable minimum estimate for the reconstitution model (see below).

The uncorrected Cochinchina death rate over the same period goes from 22 to 27 for 1000, with a mean rate of 24.0 for 1000. Although we are puzzled by the paradox of apparently complete stillbirth registration in Cochinchina and a poor overall Vietnamese death registration observed up until now, we must admit that the Cochinchina figure is rather close to "twice the value observed" by Gourou in the Tonkin Delta (14 for 1000), and that it is higher than the 19 for 1000 Catholic death rate which Gourou estimated too low. Moreover, the resulting Cochinchina natural growth rate (12.3 for 1000) is exactly in the range of what Gourou estimated for Tonkin : between 10 and 15 for 1000. Again, we may accept the Cochinchina mean death rate as Vietnam’s pre-WW2 minimum death rate value.

Detailed data and estimates on mortality patterns

Model life tables are important for demographic reconstitution, so we should carefully study Vietnam mortality in order to choose the right model life "family". Unfortunately, historical data will not be of great help. Some sporadic remarks on morbidity (malaria, tuberculosis) cannot make up a mortality pattern. The published deaths age distributions of the early 1950s and late 1930s may reveal some more indications. But the most concrete information comes from recent data. In spite of the rather questionable quality of the recent vital registration, census and survey data, several authors have been able to estimate recent mortality levels and age structures. As expected, these estimates diverge.

The Census Central Steering Committee (1991) concludes that Vietnam's mortality pattern in the late 1980s fits best to Coale and Demeny North Model Life Tables.[12] It argues on the basis of reported household deaths in the five percent sample of the 1989 census. "When comparing patterns of mortality calculated from data household death for the Vietnamese population with the families of Coale-Demeny model life tables ... we find that for almost every age group, the probability of dying of the Vietnamese population fits best with that of the North model life family, ... We conclude that the mortality pattern of Viet Nam is most similar to the pattern of the North family."[13] Further evidence comes from comparison with probabilities of death calculated from census survival rates (1979-1989) and from children ever-born data, but both of these sources are considered to be less reliable, so that "the household death data, after adjustment for under-reporting by the Preston-Coale method, provide the best indication of mortality levels".[14]

The choice of the North model life table family may surprise. These tables have been calculated from Scandinavian life tables (Iceland, Norway and Sweden). Their proximity with Vietnamese mortality is not obvious. And we have more reasons to doubt. As the Steering Committee points out, the sample death data have been corrected for under-reporting, using the Preston-Coale method. Under-reporting has been estimated at 45 % for male and 55 % for female deaths. So, the adjustment answers for about

[12] Census Central Steering Committee (1991) : 102 and further.
[13] Idem : 107.
[14] Idem : 114.

half of the probability of death value. The Preston-Coale method is a rather robust method, but we should recall the two major assumptions that condition its use : the population should be stable, and the under-reporting of deaths should be the same at all ages.[15] None of these conditions are fulfilled. Vietnam is no stable population in 1989, for at least two reasons: mortality and fertility are falling (but the Preston-Coale method is robust at this point), and the Vietnam age structure is deeply affected by several exceptional events in fertility, mortality and migration throughout the 20th century (the method is not robust at all to these age distortions). The second assumption, on age independent under-reporting, is hard to verify, but there is no a priori reason why this should be so. In a usual case of 10 or 15 percent under-reporting, this assumption may seem reasonable and the correction plausible. But in Vietnam, half of the deaths stayed unreported. Will it still be age independent? Will the correction still be plausible?

There are more arguments against the Central Steering Committee's recommendation. The comparison with Coale-Demeny model life table families (see note 14) has been done for the Vietnamese female life table only. We did it for females and males. Unfortunately, the Steering Committee did not specify how it fitted the model life tables to the Vietnamese life table, so we used different ways of fitting, summarized in table 1: the fit minimised either the sum of the square death probability differences, or the sum of the ratios, and it did so over different ages, as shown in table 1. Whatever the fitting procedure, the North family fits best the female lifetable, but it fits rather badly the male life table. This one fits better to the West life table family.

Table 1.
Results sex separated fits, Vietnam 1989 corrected household life table and Coale-Demeny model life tables ; different fitting proceedings. Best fits thick, worst fits italic.

	West		South		East		North	
	male	female	male	female	male	female	male	female
Sum[(1000q^{fam}-1000q^{VN})²]								
0-69	**328**	1086	*2826*	*1167*	667	927	1509	**306**
0-79	**833**	2529	3588	2765	871	*3342*	*4809*	**671**
1-69	**265**	841	746	351	420	*916*	*1126*	**276**
5-69	233	447	**200**	335	359	*572*	*845*	**210**
Sum[(q^{fam}/q^{VN})²]								
0-69	**0.445**	*1.525*	*1.620*	1.426	0.917	1.352	0.660	**0.963**
0-79	**0.448**	*1.602*	*1.639*	1.488	0.917	1.525	0.767	**0.968**

Yet, table 1 shows sex independent fits, whereas the Coale-Demeny model life table families have been constructed as sex dependent life tables.[16] Dissociating male and female levels offers one more fitting parameter. Theoretically, though, it cannot be justified. Male and female levels are related, depending on mortality level and the model life family. North and West sex ratios don't vary much over mortality levels, but East and South ratios do. For the present fits as for the reconstitution, we will take into account the sex dependency.[17]

[15] United Nations (1983) : 129.
[16] More precisely, we should say that the male life table levels are dependent.
[17] The sex dependent ratios are given in Coale and Demeny (1983). We use the following equations, obtained by linear regression :

West male e_{10} = 0.928 * West female e_{10} + 1.4178
North male e_{10} = 0.9568 * North female e_{10} - 0.271
East male e_{10} = 0.8305 * East female e_{10} + 7.037
South male e_{10} = 0.8637 * South female e_{10} + 5.2372

Where e_{10} is used as the variable that determines the mortality level.

Table 2.
Results sex combined fits, Vietnam 1989 corrected household life tables and Coale-Demeny model life tables ; different fitting proceedings. Best fits thick, worst fits italic.

	West	South	East	North
$Sum[(1000q^{fam}-1000q^{VN})^2]$				
0-69	**1605**	*4244*	1669	2236
0-79	**6946**	10461	7725	*10699*
1-69	1545	**1374**	1574	*2081*
5-69	1164	**1007**	1166	*2005*
$Sum[(q^{fam}/q^{VN})^2]$				
0-69	2.100	*3.050*	2.285	**1.624**
0-79	2.193	*3.135*	2.467	**1.738**

Table 2 shows the results of the fits on both male and female life tables combined. As expected, the results on the West and North model life table families get closer. In terms of square value differences, the West family fits best. In terms of ratios, it is the North family. The difference lies in the weight of age groups where death probabilities are low. The ratio fitting procedure attaches the same weight to all age groups, whereas the square difference procedure weighs the age groups by the death probability value. In other words, the ratio fit relies upon young adult death probabilities as much as upon infant and senior mortality, whereas the square difference procedure relies in the first place upon infant and senior mortality.

Environmental plausibility and observation evidence bring us to prefer West family model life tables. Yet, there is one more theoretical argument. North - as well as East and South - model life tables are very specific, they concern a limited group of resembling countries. The West family, on the contrary, is a residual group. So, even if for some odd reason the North model life family would be closer to 1989 Vietnamese mortality than the West model life family, this does not mean it has necessarily been so throughout the century. That is the third reason why we choose the West family rather than the North - as did other researchers working on Vietnam (Merli 1997, Hirschman et al. 1995).

Some additional evidence may come from the 1991 Vietnam Life History Survey.[18] Hirschman et al. (1995) analyse its data and publish war and non-war survival rates at different time periods : before 1955, 1955-1964, 1965-1975 and 1976-1990. The limited data did not admit estimation of complete life tables. The calculated survival rates cover 15 year age intervals, from age 15 to 30, 30 to 45, 45 to 60, 60 to 75 years. Hirschman et al. estimate war and non-war mortality over the last decades. Their findings on war mortality will be used further on (see below), but at this point, we will use the non-war survival rates to study their proximity to the different model life table families.

[18] Center for Studies in Demography and Ecology 1993.
Hirschman et al. 1995

Table 3. Vietnam 1976-1990. War deaths excluded survival rates estimated by Hirschman et al. (1995), implied Coale-Demeny mortality levels.

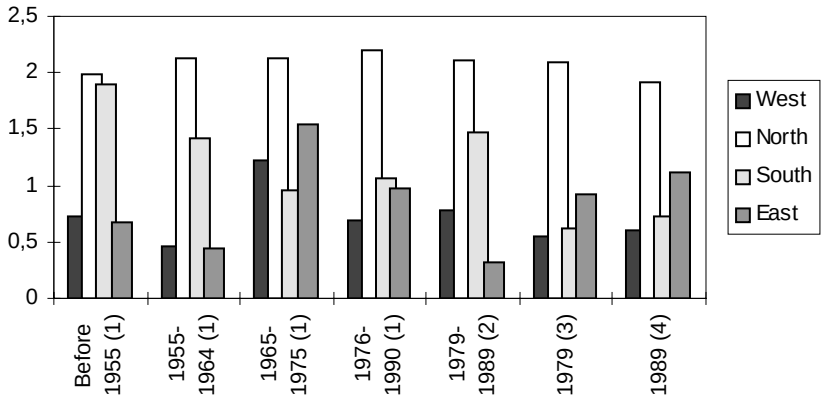
	Probability of survival between ages		Closest joint mortality level	Closest joint mortality level	Closest joint mortality level	Closest joint mortality level
Exact age	both sexes		WEST	NORTH	SOUTH	EAST
	p(x)		female e(10)	female e(10)	female e(10)	female e(10)
15	0,981		64,1	67,073	65,852	64,223
30	0,968		65,122	66,696	67,061	65,071
45	0,892		65,417	63,407	64,482	65,712
60	0,627		66,177	61,705	64,522	67,061
15-45	0,95		64,792	66,914	66,64	64,811
15-60	0,847		65,089	64,985	65,408	65,251
mean			65,116	65,13	65,661	65,355
st_dev.			0,686	2,197	1,068	0,97

Table 3 shows both sexes survival rates for 1976-1990 and the implied mortality levels for the different Coale-Demeny mortality families. A perfect fit of estimated survival rates with one of the mortality families would show the same implied mortality level at all ages, so the standard deviation of the implied levels is an indicator for the mortality family that fits best Vietnamese mortality pattern. As table 3 shows, the West family fits best to Hirschman's estimates of Vietnamese survival rates, at least for the 1976-1990 period.

We did so for all four time periods of Hirschman's estimates, and applied the same proceeding on the three more life tables we know about for recent Vietnam: the 1979 reported life table[19], the 1989 corrected household life table, and Merli's most recent life table estimation.[20] So far, we are not interested in estimated mortality levels; we only want to know which Coale-Demeny family fits best the estimated mortality patterns. In other words, which one produces the smallest standard deviation of implied mortality levels at the different ages. That is what figure 1 pictures.

[19] Vietnam, General Statistical Office 1983
[20] Merli G. 1998

Figure 1
Standard deviation of implied female life expectancy at 10 years for broad age groups, different life tables and different model life table families;
Sources : (1) Hirschman et al. 1995 ; (2) Merli G. 1998 ; (3) Vietnam General Statistical Office 1983 ; (4) Census Central Steering Committee 1991.

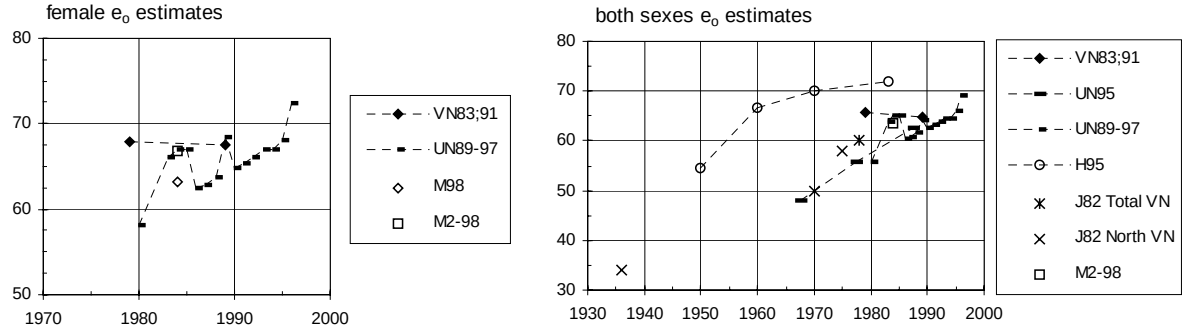


Measured this way, the North family clearly fits worst. West and East families fit best, the South family lies in between. Of course, this is only a rough test, but it confirms our choice of the West tables.

Detailed data and estimates on the mortality level

The recent survey and census data have led to different mortality level estimates. Figure 2 shows the wide range of their estimates, even at very recent dates. All mortality level estimates have been translated into life expectancy at birth values, which is the most expressive comparative unity.

Figure 2.
Life expectancy at birth, different estimates for Vietnam and North Vietnam ; VN83;91 : Vietnam 1983 and 1991 ; UN89-97 : United Nations 1989 and 1997 ; UN95 : United Nations 1995 ; H95 : Hirschman et al. 1995 ; M98 and M2-98 : Merli 1998 (see text) ; J82 : Jones 1982)



Over the 1975-1996 period, independent female life expectancies at birth have been estimated by different authors. Both Vietnamese values (VN83;91) have been estimated at the time of a census. The 1979 estimate has been reviewed in particular by Banister (1985). It is on her reviewed estimates that the United Nations based their annual life expectancy estimates. The 1989 estimate is again above the UN estimates. We have commented on this estimate already. Merli (1998) studied inter-censal mortality using both census figures. Her study is the most recent and, probably, the best established so far on recent Vietnamese mortality. Merli estimates mortality levels at all ages. The mortality level at birth is

well in line with the UN estimates. But at ages 1 to 74, Merli's mortality level estimates are notably lower. Their mean value come close to the Vietnam 1983 and 1991 values. Figure 2 shows this value as M2-98.

Looking at all life expectancy estimates for both sexes, the same uncertainty at recent estimates shows up. Jones' estimates are well in line, but they are partly based on the same sources. Only Hirschman's estimates are considerably higher. It should be noticed that Hirschman et al. are the only authors using recorded deaths without correction for under-recording. This is likely to have under-estimated the mortality level.

Before 1975, only Hirschman and Jones mention life expectancy estimates (Jones for North Vietnam). Given preceding considerations on recent death registration, we should not grant too much credit to these estimates. The same prudence is required for the information we get from the deaths age distributions we dispose of and that we analyse in Appendix 1. This information has not allowed any consistent conclusion on mortality levels before 1975.

Estimates on exceptional mortality

Exceptional mortality has been evident twice over the studied period. The first peak was the 1944-1945 famine, which may have killed from 500,000 to 2,000,000 persons.[21] With the ordinary death rate somewhere between 2 and 3%, the number of ordinary annual deaths will have been between 440,000 and 660,000. Extra annual deaths may have numbered between 250,000 and 1,000,000. This is approximately as much as ordinary deaths numbers. Of course we don't dispose of any detailed information on sex or ages, but we do have this information for a famine that occurred in 1943-1944 in Bengal (Maharatna 1996) and that seems to have been of equal force. It doubled ordinary deaths during two years. So we will use the age and sex specific ratios of famine to ordinary deaths Maharatna published for rural Bengal (Maharatna 1996 : 168). The sex and age structure of famine deaths will remain unchanged, but the total number of famine deaths will be searched for during the reconstitution.

The second episode of exceptional mortality we will take into account concerns the American war (1965-1975). Unlike famine deaths, war deaths have sex and age specific death rates that are far away from ordinary death rates. So even if the estimated number of total war deaths is approximately the same as the estimated famine deaths, their impact on the population's age and sex structure has been much more important. We will use the only age and sex specific extra war mortality rates published so far : Hirschman et al. (1995). As for famine deaths, the age and sex structure will remain fixed, but the total number of extra war deaths will be searched for during the reconstitution.

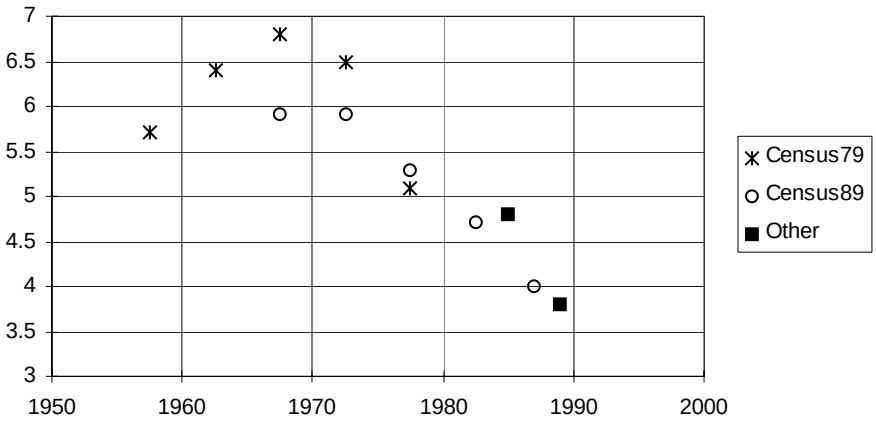
Detailed data and estimates on fertility

The situation here is quite similar to the one on mortality: before 1975, there is no reliable information on fertility. There are no estimates either, nor is there any local data that could reveal information on fertility rates. We are forced to concentrate on recent estimates.

Recent TFR estimates come from two sources mostly : from census information (1979 and 1989 ; see Central Census Steering Committee 1991 : 95) and from local surveys (for survey results until 1989, see Feeney and Xenos 1992 : 60). Figure 3 reprints Feeney and Xenos' graph of falling TFR.

[21] Hirschman et al. 1995

Figure 3
Total Fertility Rate Estimates According to different Sources



Fertility has definitively been falling from over 6 to about 4 children per woman between 1970 and 1990. Before 1970, the reverse survival method reaches its limits. Already in the early 1970s, the same method applied to two different censuses gives very different estimates, revealing once more the relative quality of all demographic measures in Vietnam, even of the most recent ones.

Detailed data and estimates on international net migration

Direct international migration data is not available. The Annuaires Statistiques of colonial Vietnam publish some official migration data in the 1920s and 1930s, but this concerns only organised Asian in- and out-migration of non-Vietnamese. Almost all of them are Chinese. From 1923 through to 1940, annual net Chinese in-migration amounted to 12,400 for Cochinchina and 2000 for Tonkin.[22] But at the same time, Gourou (1936) estimates annual net Tonkin out-migration at 3800 for the 1926-1934 period.[23] The unorganised annual net out-migration is estimated by him at less than 1000.[24] So, annual total net out-migration could have been something like 3000 for Tonkin. This means an annual 0.4 for 1000 net out-migration rate. The net in-migration rate for Cochinchine may have been more important : between 1 and 2 for 1000. Annam's net migration being far smaller, total Vietnam's annual net migration rate may thus have been about 1 for 1000 in the 1920s and 1930s, which is to be compared with the annual 10 to 15 for 1000 natural growth rate at that time. Incertitude is big enough to neglect this pre-WW2 international migration.

After WW2, the French and the American war, net migration increases considerably. Merli (1997) suggests a very detailed and well documented sex and age specific estimate for 1979-1989. It concerns 550,000 out-migrants, still alive in 1989. Similar precise estimates do not exist for the 1975-1979 period. So, we will use Merli's sex and age structure, but determine total net migrants over the 1975-1989 period at the reconstitution. This incertitude should not worry too much. Total net out-migration over the 1975-1989 time period runs at an annual rate of 0.6 to 1.2 for 1000, very much like the pre-war rates, though the flow goes out this time. The natural growth rate being over 20 for 1000, the effects upon the population evolution remain marginal.

[22] Vietnam, Gouvernement General de l'Indochine (1941), Resume statistique relatif aux annees 1913 a 1940, Hanoi, p. 2

[23] Gourou 1936: 217. "Au total, l'emigration organisee a enleve au delta du Tonkin 89000 individus en neuf ans; 55000 sont revenus; la moyenne annuelle de la perte de population due a l'emigration organisee est donc de 3800 ames…"

[24] Gourou 1936: 216. "On est certainement tres au-dessus de la realite en estimant que chaque annee il part du Tonkin un millier d'emigrants de plus qu'il n'en revient."

Detailed information on total population and growth rate

Total population estimates exist from the late 19th century on but, as we saw earlier, they are by no means reliable. For different reasons, these estimates understate total population at least for 10 to 15 percent. The Vietnam total population reconstitution would be suspect if it found total population values less than 10 percent over the reported values. For 1989, of course, this cannot be held any more. But given the quality context of the 1989 census, we cannot exclude under-enumeration at very young or very old ages. That is why the reconstitution will fit the 15-69 aged population rather than the total population.

Inversely, total population growth rates will be over-estimated by a gradually disappearing total population under-enumeration. A 15 percent under-enumeration disappearing over 70 years will lead to a 0.2 points overestimate of the annual growth rate. So, growth rates may be used as guidelines for the reconstitution, but carefully, and as more-than-maximum estimates. We will use growth rates calculated from reported total populations in the pre-WW2 Annuaires Statistiques and, for post-WW2, we will use growth rates calculated from the International Database of the U.S. Census Bureau (Banister 1985).

Conclusion on data sources and estimates

Demographic data sources on colonial Vietnam are as unreliable as we expected them to be. Nevertheless, reported data give some idea of what we might find as we reconstitute Vietnam's demographic past.

Study of recent data brought us to use the West model life tables rather than the North ones. Excessive famine mortality rates will be borrowed from Maharatna (1996), excessive war mortality estimates from Hirschman (1995). International net migration estimates will be used from Merli (1997), but they do not seem important enough to disturb seriously the demographic reconstitution.

This is not so for ordinary mortality and fertility levels. For recent decades, mortality and fertility estimates exist but vary widely (Hirschman et al. 1995, Haughton 1997). For pre-WW2 Vietnam, the data at our disposal is even less precise (only birth and death rates) and less reliable. We will have to formulate different possible scenarios.

PART II : Estimating procedure

Reconstituting Vietnam's population history means putting together all the pieces of information. But, unlike an ordinary puzzle, many pieces will not fit unchanged into the overall picture because they are biased or simply inexact right from the beginning. That is why the order of the proceeding is important. We will start with the most solid information, i.e. the 1989 age and sex figures. Of course, we expect to find under-reporting for the first age groups and mis-reporting at the elder age groups, but at ages 15-69 registered numbers will be close enough to reality.

The second most solid historic information is the general population growth over 1911-1943 and 1943-1989. Reported growth over these periods has been 53 % (1911-1943) and 185 % (1943-1989). Part of this growth is explained by reducing under-reporting. An extreme assumption of under-reporting would be 30 % in 1911, 15 % in 1943 and 5 % in 1989. According to this assumption, growth would have been 36 % (1911-1943) and 160 % (1943-1989). A low assumption would be 15 %, 10 % and 3 %. Growth, then, would have been 47 % and 167 % respectively. The ranges of 36-47 % and 160-167 % are quite small compared to the ones going with historic mortality, fertility or migration estimates. We will use the mean under-reporting assumptions of 22 %, 12 % and 4 %, resulting in growth estimates of 41 % and 165 %.

The first step of the reconstitution is then to determine the shape of the mortality transition that 1) falls inside the observed estimates, 2) assures close observed population growths over 1911-1943 and 1943-1989, with 3) constant TFR until 1970.

The observed estimates of mortality decline commented on above are shown in figure 4, with manually determined maximum and minimum estimate curves. These limits describe a very large band, especially before 1975. Their mathematical formula has been defined empirically. It uses :

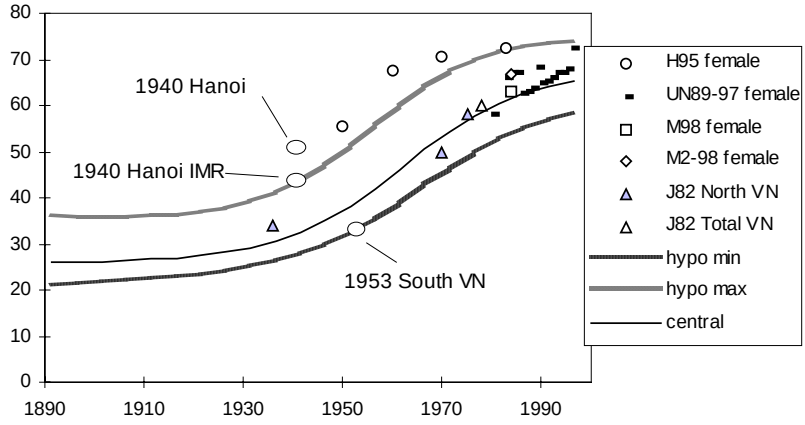
$$e_{10} = \frac{MAX - MIN}{1 + e^{k\cdot(t_0 - t)}} + MIN + w \cdot \left(\frac{t_1}{t}\right)^u \cdot m \qquad (1)$$

$$e_0 = A \cdot {e_{10}}^4 + B \cdot {e_{10}}^3 + C \cdot {e_{10}}^2 + D \cdot e_{10} + E \qquad (2)$$

The first part of (1) describes a logistic curve using *MAX*, *MIN*, *k* and t_o as parameters. The second part introduces a set of transformations of the initial curve using *w* as a weighting factor for maximum error *m* ($-1<w<1$), and *u* as a weighting factor for the time. Function (2) is an empirical approximation of e_0 from the female e_{10} entry used to determine the Coale and Demeny West model life tables.[25]

Trial and error fixes *MAX* = 62.4; *MIN* = 29.5; t_0 = 1956; *k* = 0.07; t_1 = 1996; *u* = 10; and *m* = 7 to obtain the following curves for different values of *w* (see figures 4 and 5). Maximum and minimum patterns correspond to *w* = 1 and *w* = -0.6. The "central" hypothesis corresponds to *w* = 0, but is not to be taken as a central hypothesis. *MAX* and *MIN* are calculating parameters and are not to be taken as e_{10} minimum and maximum values.

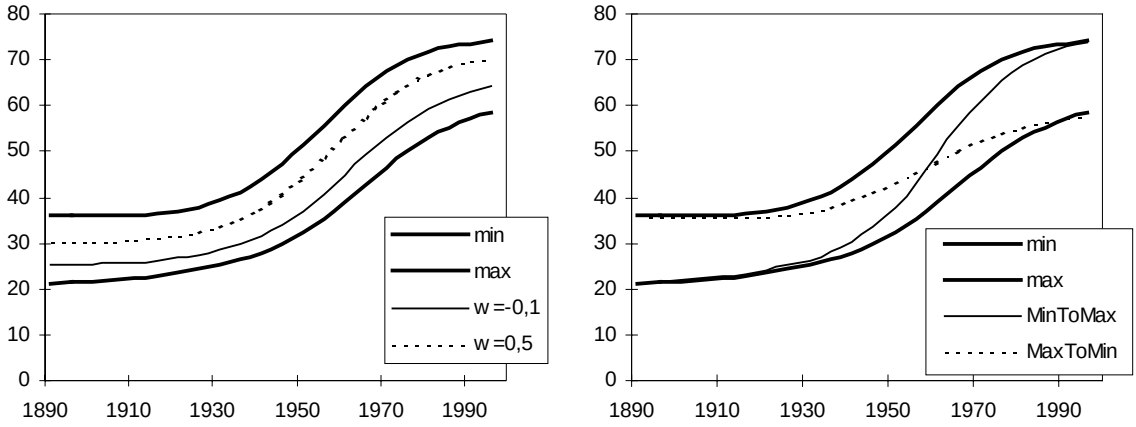
Figure 4
Mortality Transition Patterns for different values of *w* compared to some mortality level estimates
See figure 2 for legend description. For Hanoi and South Vietnam estimates, see appendix 1.



Theoretically, Vietnam's life expectancy pattern may have followed any curve within the estimated limits. In practice, however, we will study two families of curves. First, by varying *w* from -0.6 to 1, the curve will move upwards from the minimum curve to the maximum curve (figure 5, left). Second, by varying *w* and *MAX* at the same time, the e_0 curve will move from the minimum to the maximum pre-transitional level, and at the same time from the maximum to the minimum actual level (figure 5, right).[26]

[25] The female e_{10} entry should not be confused with the e_{10} value of the life table it determines. It is the mortality level parameter that serves to calculate the table (see Coale and Demeny 1983).
The *A* ... *E* values used in equation (2) are : -2.7292368E-5; 4.55E-3; -0.2545; 6.57124; -42.8.
[26] *MAX* and *MIN* being calculating parameters only, *MIN* may remain constant, it still allows the life expectancy pattern to move from max to min as from min to max.

Figure 5
Model Mortality Decline Patterns



We need additional assumptions to make up a full simulation. First, we consider 1879 to be the starting point of the mortality transition, and Vietnam's population age structure at that time to correspond to the stable population that results of the estimated e_0 in 1879 and the TFR level that brings the simulation to a 373.7 % population growth over 1911-1989. Second, recent TFR values are fixed at 6.3 in 1969-1973, 5.6 in 1974-1978, 4.8 in 1979-1983 and 4.1 in 1984-1988. Third, the fertility age pattern is supposed to correspond to the Hutterite age pattern. Fourth, international net migration is supposed to be zero.

With these assumptions, each life expectancy pattern corresponds to one TFR level (constant over 1879-1968) that assures 373.7 % population growth in 1911-1989, and will produce a population age structure in 1989 that we compare to the 1989 census age structure. Figure 6 shows, as an example, the ratio of the projected to reported population age structure in 1989 of the "central" mortality decline pattern (w = 0 and MAX = 62.4).

We note a particularly bad fit at ages 40-49, especially for men, and at ages 75+, especially for women. For adults, the misfit is likely to come from excess war mortality or from recent adult out-migration. We may hope to correct this further on with the help of Merli's and Hirschman's estimates. But for elder men and women, the misfit may have many causes. First of all, the life expectancy pattern may have been chosen wrongly, so that too many elder men and women survived in the simulation. In that case, varying w and MAX will correct this misfit. But the misfit may also come from mis-reporting at the 1989 census, especially from overestimating of age of the oldest. Third, it could come from the difference between the West and Vietnam's mortality age patterns.

Figure 6
Ratio Simulated to Reported Population Age Structure in 1989

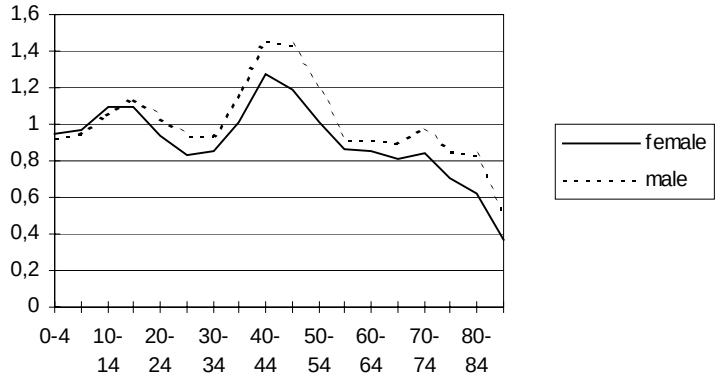
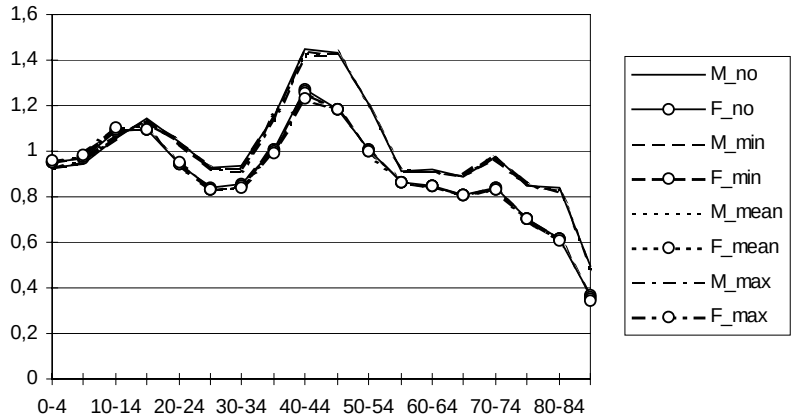
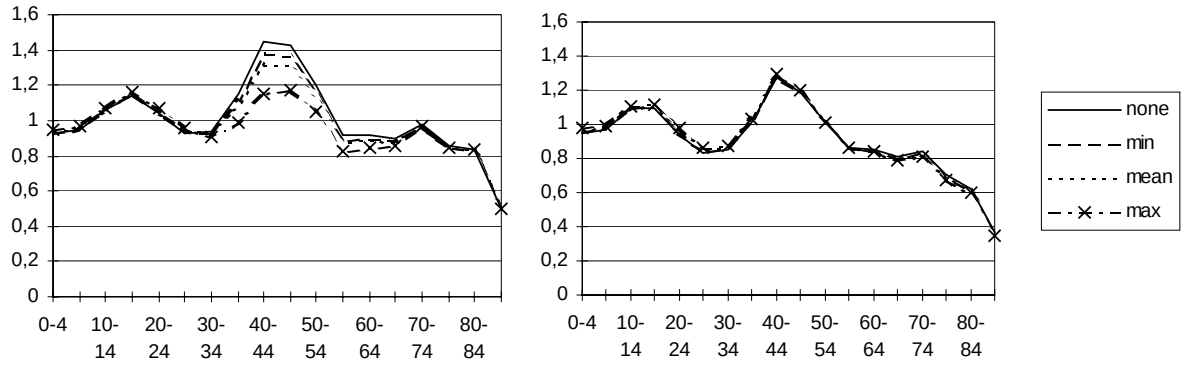


Figure 7
Introducing 1975-1988 net out-migration hypotheses
M = male; F = female; min = 550,000; mean = 1,100,000; max = 2,200,000



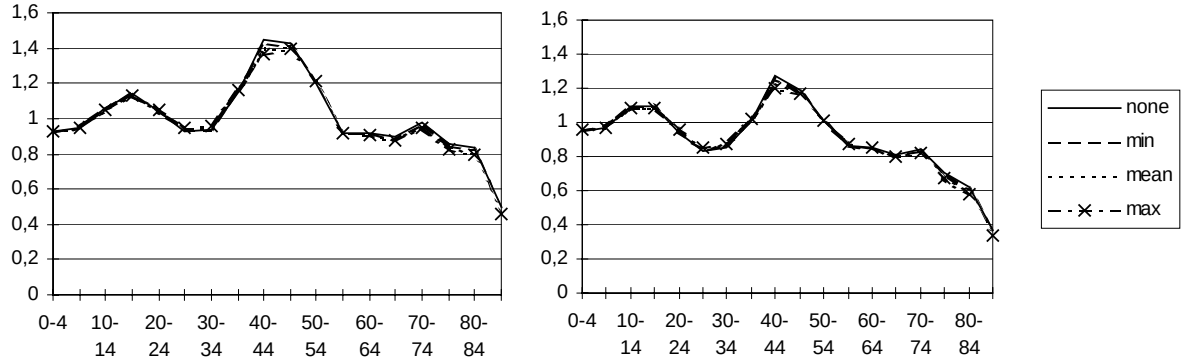
Let us first see the incidence of the three exceptional demographic events we know of, on the 1989 fit. Figure 7 shows the ratio of 1989 simulated to reported age structure after introducing three different out-migration assumptions, using the Merli net out-migration age and sex structure. Male and female age structures show up insensible to the different out-migration assumptions. The main reason is the fact that Merli's net migration estimates cover all sex and age groups. Our earlier supposition that it's effects would not be important enough to disturb seriously the reconstitution turns out to be right. But, on the contrary, having no measurable effect on the 1989 fit, the reconstitution offers no arguments to distinguish between the three migration hypotheses. We will continue the reconstitution with the mean hypothesis (1,100,000 net out-migrants), but without any particular argument related to the reconstitution.

Figure 8
Introducing 1965-1975 War Excess Mortality hypotheses
male left; female right; min = 500,000; mean = 873,000; max = 2,000,000



Unlike out-migration, the war excess mortality assumptions of Hirschman et al. do have a real impact on the male 1989 fit. The reason is simple: Hirschman's war excess mortality rates are very much concentrated on 15-30 year old men. In 1989, most of these men were 35-54 years old. So, introducing war excess estimates brings down the male adult misfit, as we hoped it would. And this effect being measurable, we may look for the excess war mortality assumption that best suits the reconstitution and that is not necessarily the one Hirschman et al. proposes.[27] We have chosen to increase war mortality rates so that the male "misfit" at ages 35-54 equals approximately the female "misfit" at these ages. Hirschman's war mortality rates have been multiplied by 1.7, which results in a total of war related deaths of 1,463,000. This is more than Hirschman's estimates that go from about 800,000 to 1 million, but it is more in line with most pre-Hirschman estimates that go from 1 to 3 million (see Hirschman 1995: 783-784).

Figure 9
Introducing 1944-1945 Famine Excess Mortality hypotheses
min = 500,000; mean = 1,255,000; max = 2,000,000



[27] Our mean estimate (873,000) results from the application of Hirschman's war related mortality rates to our population by age estimates. It lies within the margins Hirschman et al. proposes: 798,000 to 950,000 deaths of age 15 or more. Yet, we feel free to increase the war mortality rates if the reconstitution suggests so. Indeed, Hirschman's survey is based on reported household deaths that we saw already under-estimated as far as non-war mortality is concerned. There is no reason to think war mortality would have been exempt of under-reporting.

The third major demographic incident we may estimate separately concerns the 1944-1945 famine. As explained above, we use the 1943-1944 Bengal excess famine death rates by age and sex published by Maharatna (1996). As shown by figure 9, the effects on the 1989 fit are unmeasurable, for the same reason as we observed for the out-migration: the excess mortality is spread over all age and sex groups and follows, even more so than the out-migration rates, rather closely the normal mortality age pattern. So here again, we cannot rely on the reconstitution to choose between the famine assumptions and we continue the reconstitution with the mean assumption.

Now, having introduced the three demographic incidents into the model, we can go back to the initial question: which shape of mortality transition 1) falls inside the observed estimates, 2) assures close observed population growths over 1911-1943 and 1943-1989, 3) with constant TFR until 1969? We may add: which mortality pattern constitutes the best 1989 fit? Which one observes the vital rate estimates in the 1930s?

Table 4 summarizes some indicators for the two families of mortality patterns we determined above (figure 5). For every value of *w*, and/or *MAX*, we calculated the 1879-1968 TFR value that assures a 373.7 % population growth over 1911-1989 on the base of a stable population in 1879 that results of the e_0 and the TFR level at that time. The indicators that allow evaluation of each simulation are: the population growths over 1911-1943 and 1943-1989 respectively; the TFR level before 1969; the male and female slope coefficients of the 1989 fit[28]; and the birth and death rates in 1934-1938.

Table 4
Simulated reconstitution data for different values of *w* and *MAX*

		Growth			1989 fit slope coefficient		1934-1938	
w	*MAX*	1911-43	1943-89	TFR	male	female	birth rate	death rate
-0.6	74	28	191	6.3	-0.0155	-0.0172	49.3	38.9
-0.4	70.1	33	181	6.2	-0.0144	-0.0161	48.4	37.4
-0.2	66.3	38	172	6.2	-0.0134	-0.0150	47.6	36.0
0	62.4	43	162	6.1	-0.0123	-0.0139	46.9	34.6
0.2	59.9	46	156	5.9	-0.0104	-0.0123	45.5	32.7
0.4	57.4	49	150	5.8	-0.0086	-0.0106	44.1	31.1
0.6	55	53	145	5.6	-0.0066	-0.0090	42.8	29.4
0.8	52.5	56	140	5.5	-0.0048	-0.0073	41.5	27.8
1.0	50	59	135	5.3	-0.0029	-0.0056	40.4	26.2
-0.6	62.4	46	157	7.3	-0.0224	-0.0208	56.2	42.9
-0.4	62.4	45	159	6.9	-0.0191	-0.0186	52.9	39.9
-0.2	62.4	44	160	6.5	-0.0159	-0.0163	49.8	37.2
0	62.4	43	162	6.1	-0.0123	-0.0139	46.9	34.6
0.2	62.4	42	163	5.7	-0.0088	-0.0114	44.2	32.1
0.4	62.4	42	164	5.4	-0.0051	-0.0088	41.6	29.8
0.6	62.4	41	165	5.1	-0.0014	-0.0061	39.3	27.7
0.8	62.4	41	165	4.9	0.0024	-0.0034	37.1	25.7
1.0	62.4	41	165	4.6	0.0062	-0.0005	35.1	23.8

The first part of table 4 shows the effects of rotating the mortality pattern (figure 5, right). The first line (w = -0.6, MAX = 74) describes a mortality transition pattern from very high pre-transitional to very low actual mortality. Of course, population growth has been slower than estimated over 1911-1943 (28 % against 36-47 % estimated) and faster than estimated over 1943-1989 (191 % against 160-167 % estimated). Inversely, the last line of the first part (w = 1, MAX = 50) describes a very flat pattern, from very low pre-transitional to very high actual mortality. Simulated growth is evenly out of range: 59 and 135 %. Acceptable values for *w* and *MAX* range from [-0.2; 66.3] to [0.2; 59.9].

[28] We calculated the linear regression of the ratio of simulated to reported age structures in 1989 over ages 5 to 69.

The second part of table 4 shows very stable population growth estimates over 1911-1943 and 1943-1989. Instead, TFR and 1934-1938 vital rates vary more. Having observed TFR over 6 children/woman in the early 1970s, this value should not necessarily be taken as the constant pre-transitional level. But a pre-transitional level under 5 seems too low. Excluding values below 5, the range of possible patterns would be limited to $-0.6<w<0.6$. But 1934-1938 vital rates, estimated earlier at 3.7 and 2.4 %, suggest consideration of only the lower mortality levels ($0.6<w<1$), i.e. exactly those levels that are excluded for insufficient fertility. Now, 1934-1938 vital rates are no strong arguments, because they still are likely to be understated. Yet, they argue for $0<w<0.6$ values rather than for $-0.6<w<0$ values.

So far, the simulations do not indicate a clear choice of ordinary mortality and fertility levels. The slope indicator brings more decisive information, but its interpretation is complex, as the following example may show. Let us choose a w value between 0 and 0.6. The $w = 0{,}44$ value might be a good one, because this value describes a mortality decline pattern that runs through the second Merli mortality level value for 1979-1989 (see above), that we consider to be the most reliable estimate of recent mortality in Vietnam. This choice respects the population growth values (41 % over 1911-1943, 164 % over 1943-1989), and it comes close enough to the most reliable 1934-1938 vital rates estimates (41.1 % birth rate, 29.4 % death rate).

Figure 10
Ratio Reconstituted to Reported 1989 Age Structure ($w = 0.44$; $MAX = 62.4$)
Reconstituted Age Groups with constant TFR ("no TFR fit") and with varying TFR ("with TFR fit")
male left, female right

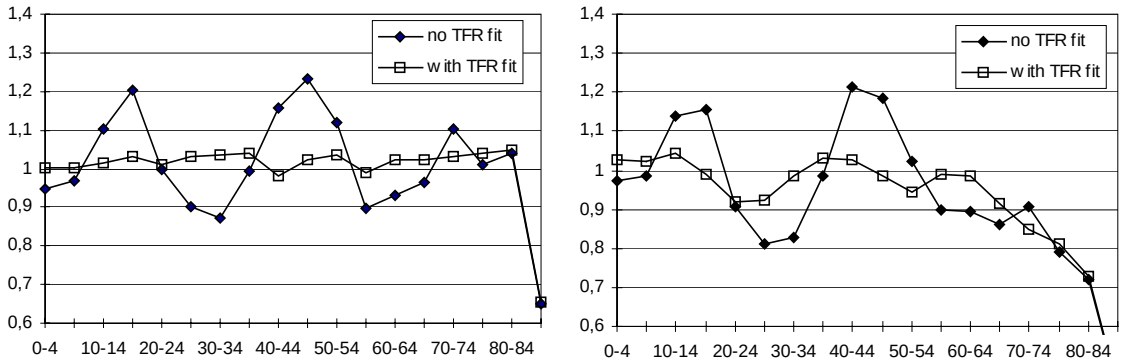
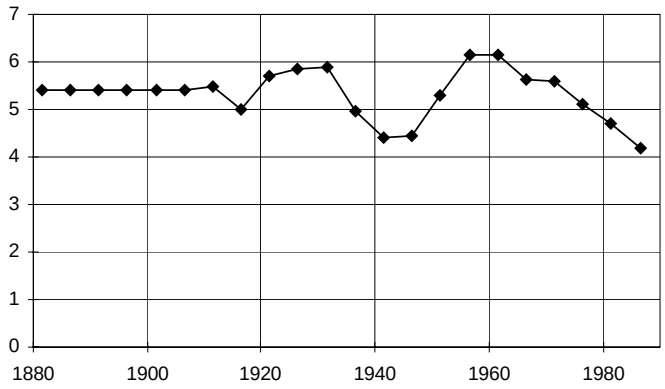


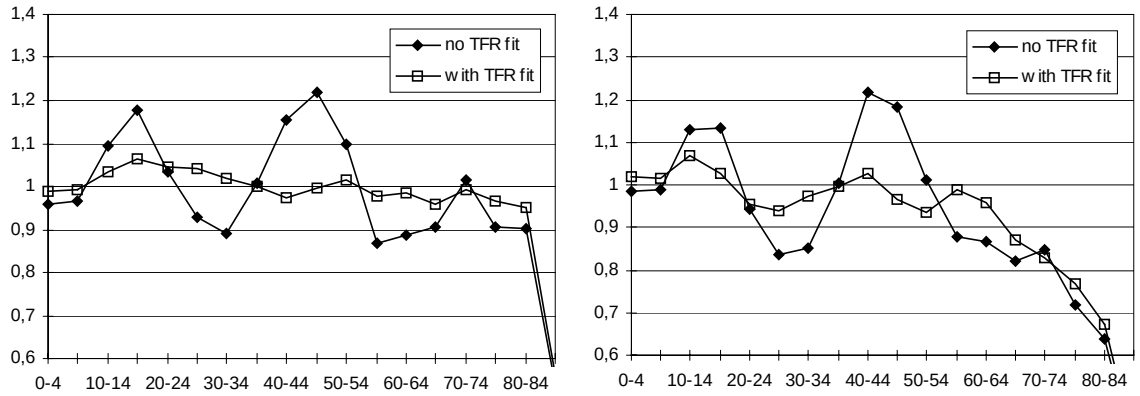
Figure 10 shows the 1989 fit with constant fertility until 1969 ("no TFR fit" curve). Male (left) and female (right) misfits are in line: over-estimation at ages 10-19 and 40-54, under-estimation at ages 25-34 and 55-69 and at 85 and over. The joint fluctuation suggests that, in reality, fertility has not been constant all over the pre-1969 period. Modulating the pre-transitional fertility level will improve the 1989 fit for both sexes. That is what the "with TFR fit" curve shows. Fitting the 1989 age structure by varying the TFR values is a very flexible step. That is why it is done at the very end of the reconstitution procedure, after determining excess and ordinary mortality levels and patterns. Figure 11 shows the fertility fluctuation used to fit the example's results to the 1989 census figures.

Figure 11
Estimated Fertility (Children per Woman)
Used in Model (w=0.44; MAX=62.4)



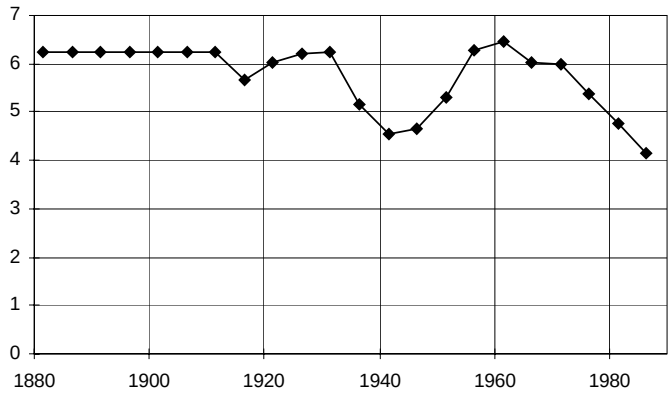
Let us now go back to the 1989 fit slope coefficient. Almost all of the slope coefficients calculated in table 4 are negative. This is the consequence of under-reporting at young ages and of age overestimation, especially for women, at older ages. Given this expected negative slope, it is hard to determine which value would be most reasonable. Nevertheless, the slope varies with the chosen mortality pattern. If this one is too low, i.e. e_0 too high, then not enough men and women die while ageing and the reconstituted/reported ratio tends to increase with age. This effect should be visible particularly at older ages, but is opposed to the age overestimation effect. To observe the mortality pattern effect only, we concentrate on men aged 50-79, age overestimation being smallest amongst these age groups. Looking at figure 10, men aged 55-79 show such a positive slope. To correct this slope, the TFR fit tends to show a decreasing slope while going back in time. This is exactly what happens in figure 11, where TFR shows a positive slope over 1900-1940.

Figure 12
Ratio Reconstituted to Reported 1989 Age Structure (w = 0.2; MAX = 62.4)
Reconstituted Age Groups before and after TFR Fit
male left, female right



So, careful observation of the 1989 fit for older males, together with the fertility fit slope, brings decisive information to the reconstitution. By trial and error, we determined the mortality level parameter (w = 0.2) that avoids the positive slopes in the reconstituted/reported ratio of elder men before TFR fitting and in the TFR estimates (see figures 12 and 13).

Figure 13
Estimated Fertility (Children per Woman)
Used in Model (w=0.2; MAX=62.4)



This is the final model we fixed for the reconstitution. Its results are described in Part III.

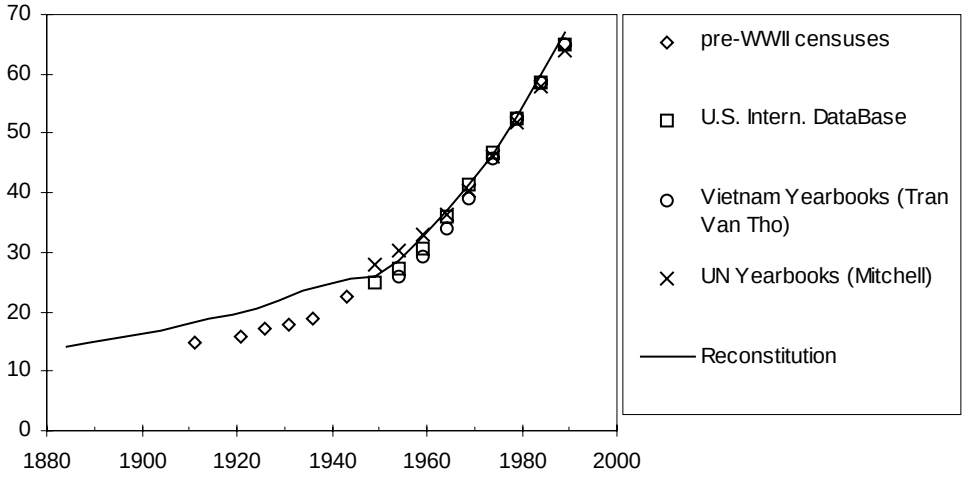
PART III: Findings

The results of the reconstitution are necessarily global results. The demographic model, even enriched with assumptions on short-term exceptional events, cannot reconstitute demographic history in all its diversity. Results have necessarily a simplified, smoothed character, responding to simple, but reasonable and consistent constraints. Other constraints would have given other results, equally consistent. Our reconstitution is just one out of all possible reconstitutions. It brings together what we believe to be the most probable historical estimates.

Total Population

The reconstituted total population evolution is not a very significant result of the reconstitution. It respects the population growth as we told it to do. Population growth has been 43 % over 1911-1943 and 163 % over 1943-1989.

Figure 13
Reconstituted Total Population and Other Total Population Estimates (millions)



The reconstituted total population evolution is very much in line with most 1949-1989 estimates. Like these, the reconstituted total population does not show any trace of the French/American war and of the post-war out-migration wave. It does show, however, the 1940-1945 depression. More so because of depressive fertility than of excess mortality, as we will see further on.

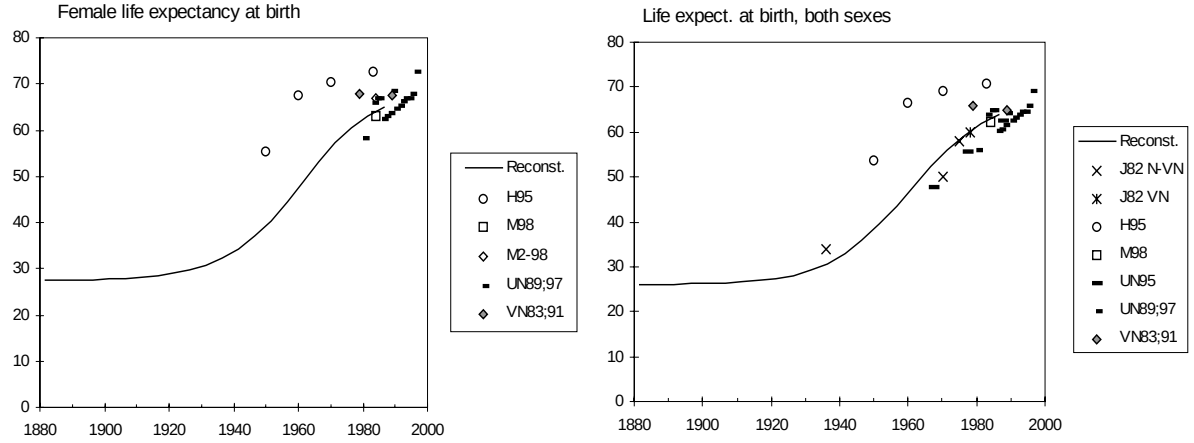
Before 1940, reconstituted values are out of line with census values. Of course, this reflects the constraints on population growth, mortality and fertility patterns, which we imposed on the reconstitution. But these constraints concerned the whole 1911-1989 period. It would not be possible to figure reasonable mortality and fertility patterns that, with the excess mortality and migration hypotheses the way they are, would reconstitute post-WWII total population values and the 1989 age structure, starting from pre-WWII census values. So, if we cannot be totally sure about the reconstituted pre-WWII total population slope, we are sure that it is impossible to reconstitute the registered 1911-1936 census values in a consistent way.

Mortality

In recent years, reconstituted mortality reaches values that are close to the Vietnam 1989 census estimate and to Merli's estimates for 1979-1989 (attributed to 1984 at figure 14). UN estimates are generally lower, whereas both Vietnam 1979 census and Hirschman et al. estimates are much higher. Jones' estimates on North and total Vietnam are generally close to the reconstituted ones, even in 1936, for which Jones himself raises the question of reliability.[29]

[29] Jones (1982) took estimates that were published earlier by the Vietnam's Ministry of Health (1981), *Health Services in the Socialist Republic of Vietnam*, mimeo, Hanoi.

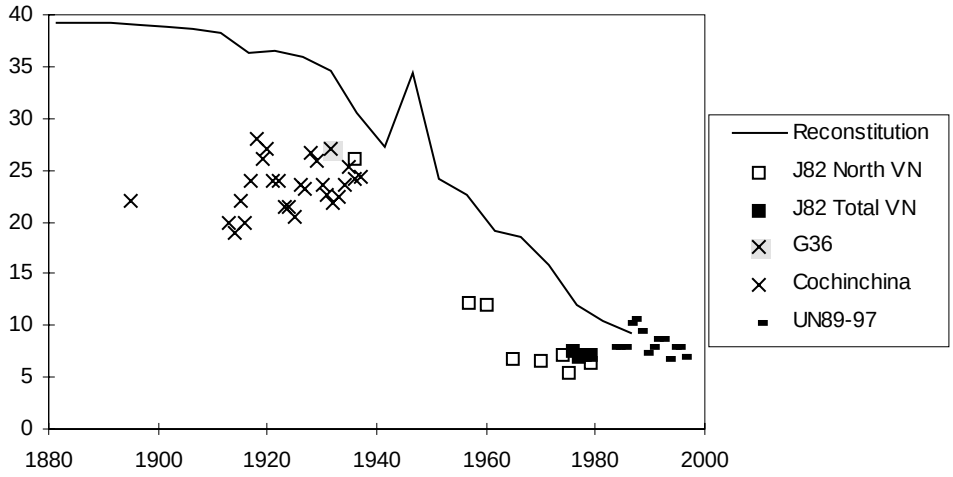
Figure 14
Reconstituted life expectancy (excess mortality excluded) and other life expectancy estimates: Hirschman et al. 1995 (H95); Merli 1998 (M98 and M2-98, see part II); United Nations 1989 and 1997 (UN89;97); Vietnam 1983 and 1991 (VN83;91); Jones 1982 North and total Vietnam (J82 N-VN and J82 VN)



Official Vietnamese life expectancy estimates at the 1979 and 1989 censuses (VN83;91) show a small decline: female life expectancy went down from 67.9 to 67.6; total life expectancy from 65.8 to 64.9. This apparent decline has been contested by various scholars (Banister 1991, Merli 1998, Bryant 1998). Of course, the reconstitution cannot be of any help in this debate, because its life expectancy pattern rises by construction. But unfortunately Vietnamese demographic data will not be of more help. One look at figure 14 will do to see how far recent mortality estimates lay apart. Moreover, none of the estimates rely on vital registration statistics (see part I). They all come from surveys, some related to a census, others not. All correct for under-reporting, up to 50 %. Only Hirschman et al. (1995) and Vietnam (1983) do not, which explains their very low mortality estimates. Given the poor quality of recent mortality data, all discussions on short term fluctuations over the last decades seem compelled to remain political, more than demographic. Indeed, just as the number of famine deaths was a point of controversy between Ho Chi Minh and the French administration, and the number of war deaths was one between Hanoi and the American Government, so is the question of a possible mortality rise in the 1980s an issue in the debate between socialism and economic renovation.

One more argument in the recent discussion has been the rise of the reported crude death rate in the beginning of the 1980s. Reported death rates rise from 7.1 for thousand in 1979 to 10.6 for thousand in 1987. The reconstitution, ignoring the increase, could have underestimated the number of deaths. This is possible, but the 1989 fit argues against it. Indeed, if mortality, over the 1980s, were higher, then more aged men and women would have died than the reconstitution supposes. In 1989, aged men and women would have been less numerous. In fact, the reconstituted number of aged men and women is already below the census number. A mortality increase would widen the gap between reconstituted and reported aged men and women even further. There is no reason to prefer this hypothesis to the more current one of a diminishing death under-registration. As figure 15 shows, under-registration has been evident throughout the past. Scholars like Gourou and administrators like Smolski were aware of this but it seems to have exceeded their estimates.

Figure 15
Reconstituted Crude Death Rates and other Crude Death Rate estimates:
United Nations 1989 and 1997 (UN89;97); Jones 1982 North and total Vietnam (J82 N-VN and J82 VN); Gourou 1936 (G36); Vietnam Annuaires 1897-1937 (Cochinchina)

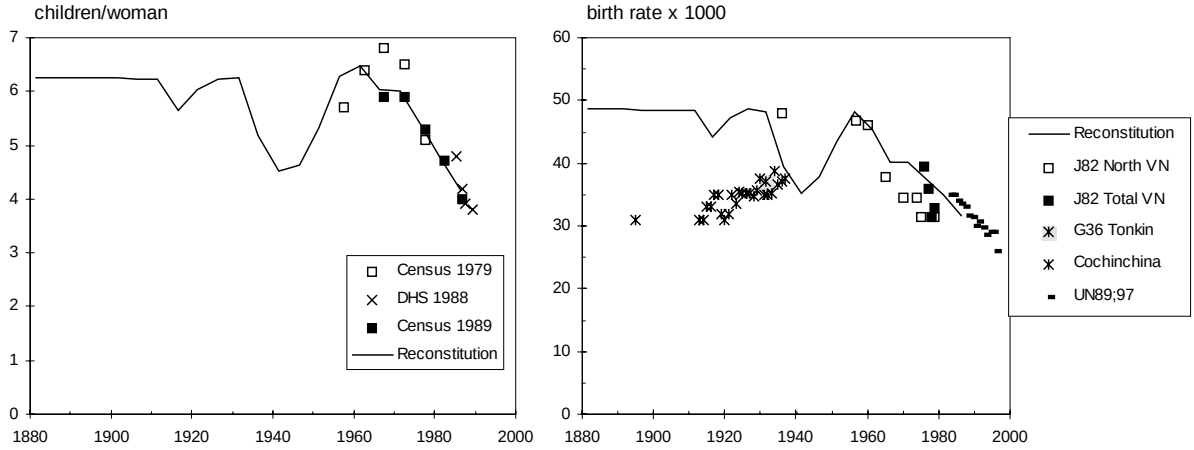


According to the reconstitution, the CDR starts declining at the turn of the century. Mortality decline accelerates in the 1930s, but WWII, and particularly the 1944-1945 famine, breaks off the starting decline. Yet, it does not seem to have affected the decline trend that takes up its downward slope throughout the post-WWII period. The American war does not really change this trend, even if the number of excess war deaths (1.40 million) exceeded the number of famine deaths (1.13 million). Spread over 11 years (1965-1975), whereas the famine was concentrated in two years, and related to a total population that had grown for about 60 % between 1945 and 1970, the American war excess mortality goes almost unnoticed at figure 15. Paradoxically, from the end of the American war on, the decline trend slows down. Of course, fertility decline is the major factor behind this, and not life expectancy stagnation. But even if the trend flattens, the Vietnam CDR is not yet at the bottom level, as official statistics suggest it would be since the early 1960s already. The Vietnamese paradox of "moderate mortality and moderate fertility combined with a very low income", that Bryant (1998: 235) pointed out recently, is certainly striking, but maybe a little less paradoxical than it seems, published death rates having been understated for a long time.

Fertility

All reconstituted total fertility rates have been calculated on the basis of the Hutterite fertility age pattern (Coale et al. 1986: 153). TFR is approximated by TFR = 12.44 I_f, where I_f is Coale's indice of general fertility. The same age pattern is used to calculate total births from the estimated TFR values.

Figure 16
Reconstituted fertility and other fertility estimates: Census 1979 and 1989 are census based reverse survival estimates (Vietnam 1991); DHS 1988: 1988 Demographic and Health Survey (Vietnam 1990); United Nations 1989 and 1997 (UN89;97); Jones 1982 North and total Vietnam (J82 N-VN and J82 VN); Gourou 1936 (G36 Tonkin); Vietnam Annuaires 1897-1937 (Cochinchina)



By construction, reconstituted fertility rates are close to the 1989 census based estimates. The 1988 Demographic and Health Survey estimates are somewhat higher. Feeney and Xenos (1992: 61-62) believe both sources to present anomalous estimates, but they conclude at a possible 10 % underestimation of the latest 1989 census based estimates. The reconstitution produces more evidence for the idea of recent fertility underestimation. It comes from the birth rate. The birth rate is estimated from vital registration data and total population estimates, whereas the TFR values are estimated by census results or survey data. Total births, then, come from different sources. Figure 16 shows that reconstituted recent birth rates are lower than Vietnamese estimates. In 1984-1988, the reconstituted birth rate is 6 % lower than the reported birth rate. Part of it (4 %) comes from the 4 % under-registration we assumed for the 1989 registered total population. But the 2 % left is the difference between the number of births reconstituted by application of the 1989 census based TFR estimate (4.15 children/woman) and the one registered by vital registration services. A difference of 2 % is negligible, but there is no reason to believe total registered births to be totally exempt of under-registration. So, even if the birth rate test does not totally confirm Feeney and Xenos' suggestion, it does argue in the same direction and makes a 5 to 10 % underestimation of recent TFR values probable. We will come back to this question when we will look at the 1989 fit.

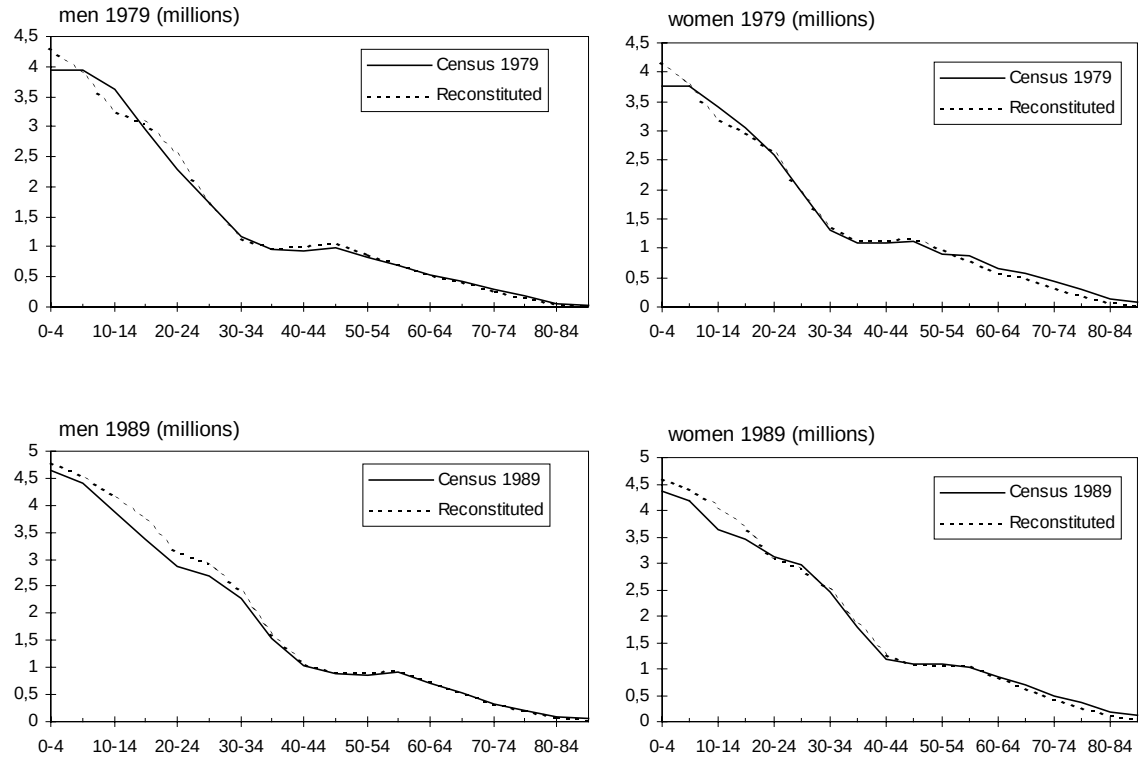
Before 1969, the reconstituted values were supposed to be constant at the level that was necessary to realise the expected population growth; subsequently, these values were modulated to fit the 1989 age distribution. The constant pre-transitional TFR level was found to be 6.25 children/woman. The pre-transitional level did not stay too constant though. It shows two depressions: one, minor, in 1914-1918, the other, more important, from 1934 through 1953. The depression context seems evident in both cases: WWI ending in the influenza epidemic, the Great Depression, WWII, the 1944-1945 famine and the French war. The second depression is surprising in its deepness and its length, especially compared to the minor depression of the American war. At that time, fertility went down from 6.5 to 6.0 only, and no recovery took place at the end of this war. Should we conclude that fertility, just as total population and mortality, was less disturbed by wars as it was by epidemics and famine?

1979 and 1989 census fits

Comparing 1979 reconstituted to registered figures would be a significant test, if the census figures, that play no part whatsoever in the reconstitution procedure, were reliable enough. Unfortunately, we cannot expect them to be so. Nevertheless, the shape of the age distribution in 1979, with its steep fall until age

30, and its second summit at age 45-49, has been reconstituted faithfully. The same shape shows up ten years later in the 1989 census figures and is reconstituted, faithfully, again. But this time, the reconstitution procedure has used the census figures.

Figure 17
Reconstituted and Registered Population by sex and age; census 1979 and 1989



At ages under 15, the reconstitution does not follow closely the 1979 census figures. The youngest have been reconstituted more numerous, which accounts for an expected under-registration of the 0-4 aged at the 1979 census. The 10-14 aged, though, born in 1964-1968, have been estimated less numerous than registered in 1979, and more numerous in 1989. This brings us back to the question of the recent fertility rates. As figure 17 shows, the census based fertility rates over 1969-1988 reproduce the 1989 census figures at age 0-19, inflated by the 4 % under-registration assumption.Incidentally, this confirms that the use of the Hutterite fertility age pattern does not bias the reconstitution.

Now, 4 % under-registration is a low estimate for the 0-4 age group, but it may be a high estimate for age groups over age 10. If Feeney and Xenos are right, and the 1984-1988 TFR were 10 % higher, then the first age group in 1989 would be reconstituted more numerous and the following age groups a little less. The 1989 fit would have been better, but the 1979 fit worse. We did not modify the reconstitution in this direction, but future estimates on recent fertility might make this necessary.

At ages over 65, reconstituted women are less numerous than registered. This is so in 1979 and in 1989. We supposed earlier that one of the reasons might be age overestimation of widows. We may now evaluate this assumption, using the 1979 and 1989 fit. If reconstituted numbers were the real numbers, and if one third of all women over age 65 were registered one age group above real age, then the over-registration of elder women would have been totally explained, in 1979 as in 1989. Of course, this

is only an assumption. Another possibility would be a particular low mortality pattern of older females, compared to the West mortality pattern. The reconstitution has no indications for or against these assumptions, and Vietnamese data does not yet allow such fine analysis.

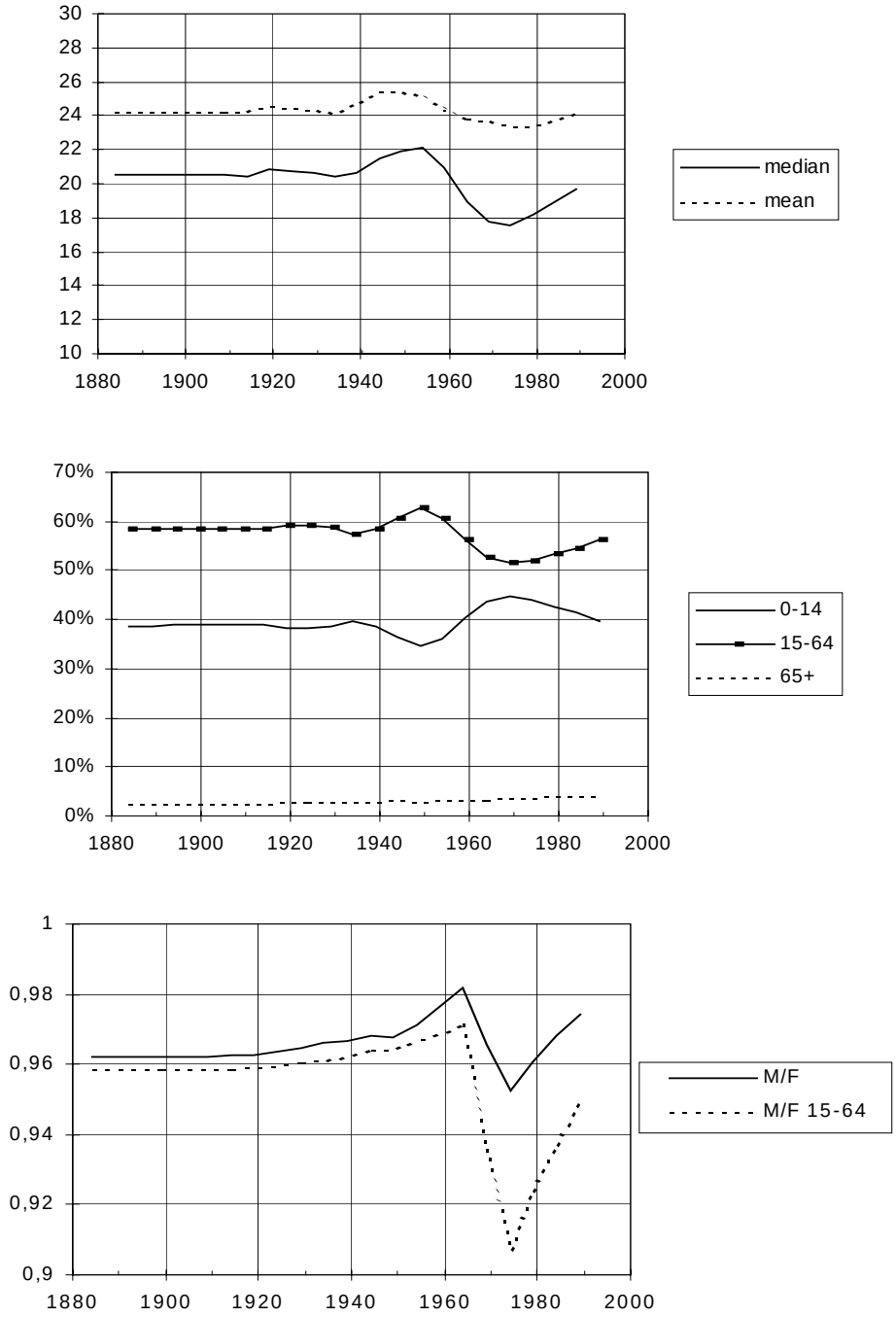
Age distribution: an overview

Detailed results are given in appendix. Here, we just show some of them. The median and mean age of Vietnamese population reflect the demographic events that marked the 1940-1989 period. The succession of low and high fertility moments, combined with mortality decline, make mean and median age fluctuate. Pre-transitional values have risen first, in the 1940s, then sloped down to rise again after 1970. In 1989, mean and median age recovered pre-transitional values, surely to go beyond in the near future.

The same perturbation affects the large age groups distribution. Adult population rises over 60 % in the 1940s, falls back to close to 50 % in 1950-1970, then rises again to about pre-transitional level. It does so because of the fluctuation of the 0-14 age group, which clearly reflects the fertility curve. So, Vietnamese age distribution has been affected by changing fertility mainly. Mortality decline, excess mortality and out-migration had no significant effect until now.

The masculinity rate, instead, follows a very different curve. It rises slowly with mortality decline, and it is seriously affected by the excess mortality of the American war, especially the adult population masculinity rate. Yet, the perturbation is almost gone in 1989. The last war scars will have disappeared before the year 2000.

Figure 18
Reconstituted Median and Mean Age (years), Both Sexes (top)
Reconstituted Population by Large Age Group, Both Sexes (middle)
Reconstituted Male/Female Ratio, All Age Groups and 15-64 Aged Only (bottom)



Concluding remarks

The reconstitution of Vietnam's demographic past, which we have presented in this paper, is certainly not the only possible demographically consistent reconstitution. It aims to be the one that fits best to reality. In order to approach historical reality, the reconstitution has proceeded step by step extracting, as

much as possible, information from the most reliable data before turning to second reliable data, and so on. In all demographic areas - fertility, mortality, migration and age distribution - the most reliable data concerns the 1980-1989 period. We examined it in detail to know about mortality sex and age patterns, fertility decline trends and population age distribution. Some of the recent data is interdependent though. The fertility decline values were estimated using the 1989 census age distribution. This interdependency showed up again at the end of the reconstitution procedure, where the reconstitution reproduced 104 % of the 1989 census figures for age groups under 15. Indeed, under-registration of the first age groups is likely, and a 4 % total population under-registration is a reasonable assumption. But under-registration should have been concentrated in the first age groups. The census dependent fertility estimates, though, block its observation and, consequently, the correction of concentrated under-registration. At this point, the reconstitution may improve as soon as more independent fertility estimates are available.

Among the second reliable data we must mention the population growth estimates over various long periods. This certainly seems deceiving: the reconstituted total population growths are about the same as the ones we estimated at the beginning. Yet, by reconstituting, we verified that these assumptions were compatible with all other reliable historical or recent information, especially the 1989 census figures. Moreover, we can demonstrate that different population growth assumptions would not satisfy the three conditions we applied to the reconstitution:

1) a close fit of 1989 census figures, at least at ages 10-69;
2) a close to constant pre-transitional fertility level (until 1969)
3) an ordinary mortality decline pattern that holds within the limits we fixed rather amply around observed values.

Using these three guidelines, we formulated the demographic scenario that satisfies as much as possible the population growth estimated over various periods. The scenario satisfies some other mortality and fertility estimates, re-evaluates others and refutes others again.

The reconstitution provides labour force estimates as far as these are age determined. The part of Vietnamese labour force population varies moderately, according to normal transitional mechanisms, but the part of men in the labour force has known a major perturbation due to the American war losses. At the 1989 census, though, the perturbation was about to be repaired.

Reconstituted age distributions in 1989 and 1979 tend to demonstrate that the latter was not as unreliable as it has been thought to be, very young and very old excepted. Both show some particularly small generations: 1914-1918, 1934-1938, 1939-1943 and 1944-1948. They all are linked to exceptional events. The Great War and the influenza epidemics, the economic depression of the 1930s, WWII and the 1944-1945 famine. It points out that the presented reconstitution is not only demographically consistent, but also socio-economically.

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APPENDIX 1

Mortality level estimates from data on death distribution

Some local sex and age specific death distribution figures have been published in the 1930s and early 1950s: Hanoi in 1925-1940 and 1950, Hanoi-Haiphong in 1951-1953; Saigon-Cholon in 1950-1953; South Vietnam in 1951-1953; the controlled areas of North Vietnam in 1951-1953 (Annuaire Statistique 1933: 57; 1935: 53; 1937: 29; 1939: 24-25; 1951: 39; 1952: 37-38; 1953: 36-37; 1955: 36-37; Bulletin économique de l'Indochine 1942: 143-144). Using some additional assumptions, these distributions of deaths may inform us further on mortality type and levels using the Bennett-Horiuchi method[30]. The main assumptions concern death under-registration and the population age structure. Under-registration of deaths is supposed to be constant by age, and the population is supposed to be a stable one. Neither of these conditions may have been fulfilled in the case of Vietnam. Under-registration is likely to be more important at very young and at older ages and none of the mentioned populations is stable. So, the results of the Bennett-Horiuchi method must be taken with care.

Let us start with 1953 South Vietnam. Registered deaths are likely to be as best as possible, because of Cochinchina's tradition of vital registration.

Figure 1

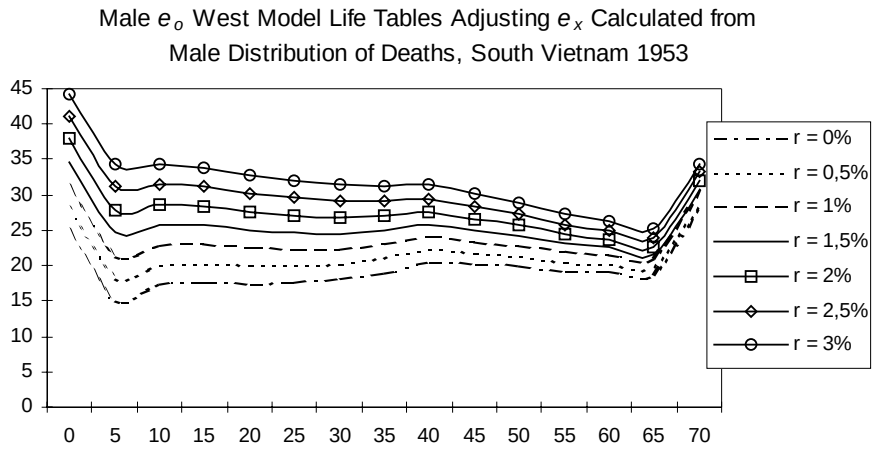


Figure 1 shows that life expectancies at age x, measured by the Bennett-Horiuchi method, are quite consistent with the West model life tables at least at ages between 5 and 70. As expected, infant mortality seems more under-registered than at ages 5 through 65, and so does mortality after age 70. Excessive infant mortality under-registration does not bias the mortality level estimates at ages 5 and above, but excessive mortality under-registration after age 70 does bias downward life expectancy estimates at all ages below 70. This will be simulated in figure 2. For the moment, we look at the influence of the annual growth rate *r* (figure 1).

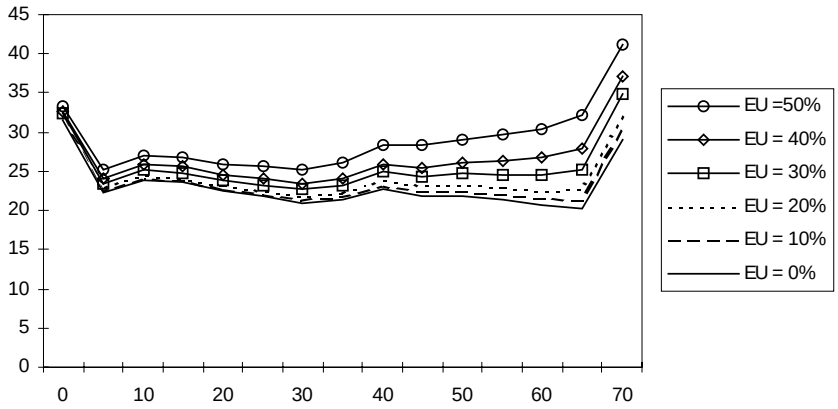
If 1953 South Vietnam's population was really stable, the type of mortality really West, and the under-registration of deaths really age independent, then the estimated e_o curve would be a flat line. In

[30] Bennett N.G. and S. Horiuchi (1984), "Mortality Estimation From Registered Deaths in Less Developped Countries", in *Demography* 21, pp. 217-233.
Preston S.H., I.T. Elo, I. Rosenwaike and M. Hill (1996), "African-American Mortality at Older Ages: Results of a Matching Study", in *Demography* 33, pp. 193-209, widened the stable population condition. They showed any set of constant age specific growth rates will do. This means that the method may be applied to local populations, where growth is often caused by migration and therefore age dependent.

fact (figure 1), the curve that comes closest to a flat line between ages 5 and 70 concurs with a growth rate value between 1.0% and 1.5%. Now, the registered mean annual growth rate for Cochinchina over 1911-1943 was 1.22%. So, the published distribution of male deaths in 1953 South Vietnam is consistent with the mean pre-WWII growth rate of Cochinchina and indicates a male life expectancy at birth of 23-25 (level 2-3).

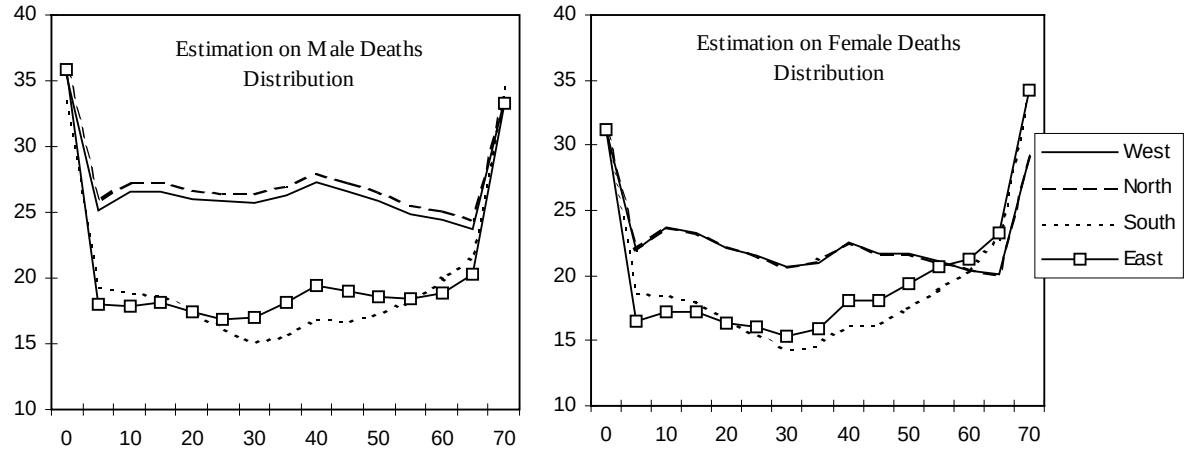
Yet, the bias introduced by excessive under-registration at older ages is not negligible. Figure 2 simulates a 10 to 50% excessive under-registration at ages over 75, i.e. on top of the age independent under-registration. It majors the mean life expectancy at birth, estimated at ages 5 to 65, up to 26%.

Figure 2
South Vietnam, 1953, Female Life Expectancy at Birth Adjusting Life Expectancy at Age x Estimated from Bennett and Horiuchi's Method on Distribution of Female Deaths with Assumption of Excessive Under-registration (EU) over age 75



We may repeat the Bennett-Horiuchi method with r = 1.22% on both male and female distribution of deaths and check all four model life table families. As indicated before, male and female mortality levels have been bound and are converted into female life expectancy at birth.

Figure 3
South Vietnam, 1953, Female Life Expectancy at Birth Adjusting Life Expectancies at Ages x Estimated from Bennett and Horiuchi's Method on Distribution of Deaths



The 1953 South Vietnamese distribution of male deaths points to a West or North mortality level corresponding to a female life expectancy at birth of 25-27 (level 3-4), whereas the distribution of female deaths points to a female life expectancy of 21-24 (mortality level 2). The difference might be explained, at least partly, by the downward bias resulting from excessive female under-registration at older ages that may have been more important than excessive male under-registration at older ages. Excessive under-estimation at older ages is likely for both sexes, though, so mortality level 3-4 must be seen as a low estimate. Yet, it is very far below the 55.5 female life expectancy Hirschman notes before 1955. It is even below the 34 female life expectancy Jones estimates for 1936 North Vietnam. The margins get so wide that the estimates become useless.

Unlike West and North mortality types, the South and East estimates are less regular and too low to make sense. The distribution of deaths analysis confirms earlier conclusions on South and East mortality families, but cannot distinguish between West and North families.

The same method has been applied to the controlled areas of North Vietnam in 1953, using the recorded 1.49% growth rate for Tonkin over the 1911-1943 period. Figure 4 shows that, if North and West estimates fluctuate around the same levels, their fluctuation is much wider than for South Vietnam. This may either reveal important quality defects of the published statistics, or express the consequences of the social and political events that struck particularly North Vietnam, amongst which we should particularly mention the famine of 1944-1945.

Figure 4
North Vietnam, 1953, Female Life Expectancy at Birth Adjusting Life Expectancies at Ages x Estimated from Bennett and Horiuchi's Method on Distribution of Deaths

Using the same method for estimating mortality levels of cities like Hanoi-Haiphong and Saigon-Cholon raises particular difficulties. First, their population age structure may be further away from a stable one, because, even if the migration age pattern were constant, their growth is likely to have been fluctuating greatly. Second, these cities registered many deaths of non-residents in their hospitals. The Annuaire Statistique (1933: 57) specifies for Hanoi: "No birth and death rate have been calculated because the number of births and deaths occurred in hospitals, partly non-residents of Hanoi, is important." From 1936 on, resident deaths have been published separately, so we may examine Hanoi resident deaths in 1940, using the West model life tables.

Figure 5
Hanoi-Haiphong Annamite Residents, 1940, Female Life Expectancy at Birth Adjusting Life Expectancies at Ages x Estimated from Bennett and Horiuchi's Method on Distribution of Deaths

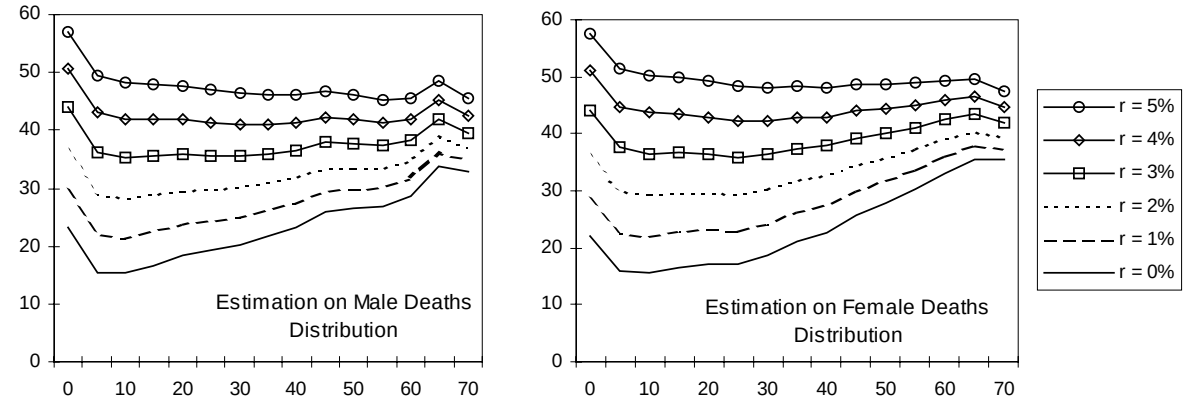


Figure 5 suggests a 4 to 5% growth rate for Hanoi-Haiphong over the years preceding 1940, which corresponds with Del Testa's (1999 : 25) estimation of Hanoi's annual 4.7% population growth between 1926 and 1937. The estimated mortality level, though, seems very low : a female life expectancy at birth of 50 years in urban Hanoi-Haiphong does not seem realistic, but it does come close to Hirschman's estimate. Yet, we have information on registered infant mortality in 1940 Hanoi : 24.5% (Bulletin économique de l'Indochine 1942: 143-144). This IMR corresponds with a West female life expectancy of about 39.5 years, and there is no reason to think Hanoi's registered IMR is over-estimated, quite on the contrary.

As a conclusion, we must admit that the study of different sources did not bring us consistent information on the mortality level before 1975. The statistics of deaths distributions may reveal information on local mortality levels, but its analysis needs more detailed information than we dispose of in this study focusing on Vietnam as a whole.

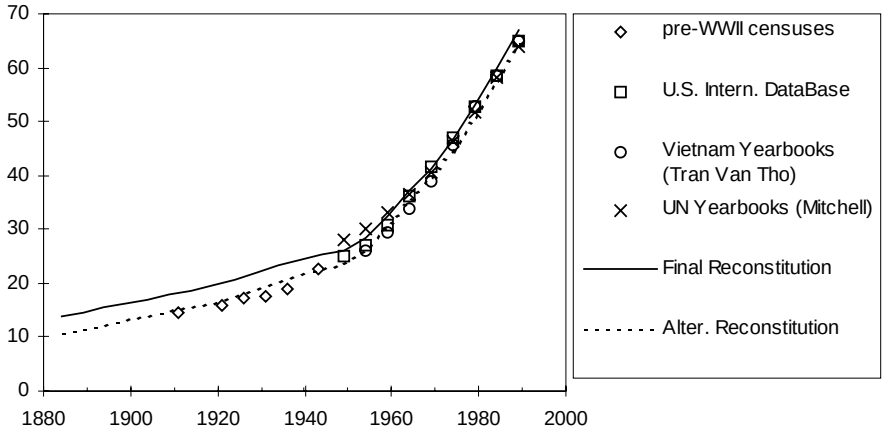
APPENDIX 2

THE ZERO UNDER-ENUMERATION ALTERNATIVE RECONSTITUTION

As argued before, the reconstitution relies on the total population growth estimates and, unfortunately, this cannot be the other way around. Any reasonable growth estimate leads to a different, but consistent reconstitution. Now, the question is: how different are these reconstitutions? To have an idea of the robustness of the reconstitution faced with different growth assumptions, we reconstituted Vietnam's population history on the basis of the registered total population estimates in 1911, 1943 and 1989. The reconstitution procedure and the exceptional demographic events assumptions are the same as above. This alternative reconstitution is beyond our minimum under-enumeration hypothesis. We do not support its results. We just study its effects on the reconstitution results.

The total population evolution is, of course, without surprise: it runs through the population estimates at the dates mentioned, and it stays very close to all intermediate estimates (figure 1).

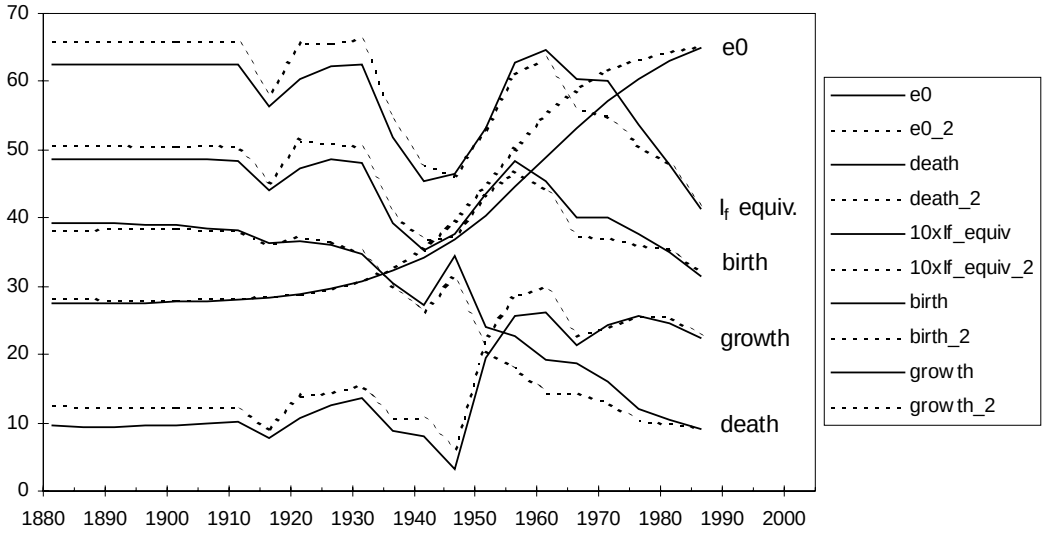
Figure 1
Final and Alternative Reconstitution: Total Population (millions)



The alternative reconstitution model is not so far away from the final one (see figure 2). The alternative model shows higher pre-transitional fertility. The birth rate (>50 for 1000) and the I_f equivalent (>6.5 children per woman) reach exceptionally high levels. Life expectancy and death rate values, on the contrary, remain very close troughout the pre-transitional period. Alternative and final estimates separate at the time of the transition, the alternative model supposing faster mortality decline. In conclusion, the alternative model supposes more natural growth throughout the period, even before the mortality transition begins.

Both models come up with the same mortality and fertility fluctuations and the distance that separates the vital estimates is most of the time reasonably small, especially if one remembers that the assumptions underlying the alternative model are beyond the minimum hypothesis. Minimum and maximum growth hypotheses would bring alternative models that would stay even closer around the final one. The reconstitution may be considered as robust in its main features.

Figure 2
Final and Alternative (2) Reconstitution
e0: ordinary female life expectancy (excess mortality excluded); death: death rate for 1000;
10xIf_equiv: Coale indice of general fertility I_f (x 10) converted in children per woman (x 12.44);
birth: birth rate for 1000; growth: growth rate for 1000



APPENDIX 3

REGIONAL TOTAL POPULATION AND LABOUR FORCE ESTIMATES FOR 1909-1954

Independent reconstitutions for Annam, Cochinchina and Tonkin are hard to realise in the actual state of knowledge. There are no recent life expectancy or fertility estimates and historical evidence is limited to some vital rates and total population estimates. Under these conditions, regional reconstitutions should assume the general Vietnamese mortality and fertility patterns and an identical population age structure in 1884. In fact, pre-WWII regional total population estimates hold evidence for this assumption: the population growth is very similar for all three regions (see part I). The part of each region in total Vietnam changes little between 1911 and 1943. Tonkin goes from 39 to 43 %, Annam from 36 to 32 %, Cochinchina remains stable at 25 %. The 1943-1954 period may have been more disturbed, the 1944-1945 famine being limited to Tonkin and northern Amman.

If mortality and fertility patterns were alike all over Vietnam and migrations flows before 1955 only marginal, then the assumption of a homogenous sex and age structure is reasonable. In that case, regional total population and labour force may be deduced by interpolation of the part each region takes in the country's population. We attributed an arbitrary 42, 30 and 28 % for Tonkin, Annam and Cochinchina in 1954.

Table 1
Regional Total Population and Labour Force Estimates, 1909-1954

	Total men				Total women			
	Vietnam	Annam	Cochinchina	Tonkin	Vietnam	Annam	Cochinchina	Tonkin
1909	8 730 227	3 142 882	2 182 557	3 404 789	9 072 024	3 265 929	2 268 006	3 538 089
1914	9 188 416	3 255 325	2 297 104	3 635 987	9 544 913	3 381 626	2 386 228	3 777 058
1919	9 550 787	3 329 131	2 387 697	3 833 959	9 921 469	3 458 341	2 480 367	3 982 761
1924	10 087 154	3 458 453	2 521 789	4 106 913	10 469 663	3 589 599	2 617 416	4 262 649
1929	10 745 441	3 622 749	2 686 360	4 436 332	11 140 017	3 755 777	2 785 004	4 599 236
1934	11 505 682	3 813 312	2 876 421	4 815 950	11 910 833	3 947 590	2 977 708	4 985 534
1939	12 036 747	3 920 540	3 009 187	5 107 020	12 450 075	4 055 167	3 112 519	5 282 389
1944	12 535 687	4 011 420	3 133 922	5 390 345	12 950 964	4 144 308	3 237 741	5 568 915
1949	12 744 279	3 950 726	3 313 513	5 480 040	13 170 937	4 082 990	3 424 444	5 663 503
1954	14 071 691	4 221 507	3 940 073	5 910 110	14 485 425	4 345 628	4 055 919	6 083 879
	Total men aged 15-64 years				Total women aged 15-64 years			
	Vietnam	Annam	Cochinchina	Tonkin	Vietnam	Annam	Cochinchina	Tonkin
1909	5 091 430	1 832 915	1 272 858	1 985 658	5 311 467	1 912 128	1 327 867	2 071 472
1914	5 350 606	1 895 643	1 337 652	2 117 311	5 580 663	1 977 149	1 395 166	2 208 348
1919	5 632 164	1 963 211	1 408 041	2 260 912	5 872 319	2 046 923	1 468 080	2 357 317
1924	5 943 427	2 037 746	1 485 857	2 419 824	6 193 578	2 123 512	1 548 395	2 521 671
1929	6 293 180	2 121 701	1 573 295	2 598 184	6 552 970	2 209 287	1 638 243	2 705 440
1934	6 581 096	2 181 163	1 645 274	2 754 659	6 848 937	2 269 933	1 712 234	2 866 769
1939	7 013 725	2 284 470	1 753 431	2 975 823	7 289 036	2 374 143	1 822 259	3 092 634
1944	7 578 385	2 425 083	1 894 596	3 258 706	7 859 226	2 514 952	1 964 807	3 379 467
1949	7 977 976	2 473 173	2 074 274	3 430 530	8 276 689	2 565 774	2 151 939	3 558 976
1954	8 518 335	2 555 501	2 385 134	3 577 701	8 811 801	2 643 540	2 467 304	3 700 956

APPENDIX 4
SOURCES AND RESULT TABLES

Table 1 : Total population, Vietnam by region : 1901–1955 (millions)

	Annam	Cochinchina	Tonkin	Vietnam
1895		2.2	6.2 (1886)	
1911	5.5	3.8	6.1	14.7
1921	4.9	3.8	6.9	15.8
1926	5.6	4.1	7.4	17.1
1931	5.1	4.8	8.1	17.7
1936	5.7	4.6	8.7	19.0
1943	7.2	5.6	9.8	22.6

	North Vietnam	South Vietnam	Vietnam
1955	13.6	13.6	27.2

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Annuaire Statistique de l'Indochine, vol. 2, p. 61
Annuaire Statistique du Vietnam, vol. 1, 1949-1950

Table 2: Population of Annam (by province)

1921				1931		1936		1943	1952		1953	
	M	*F*							cp	ucp	cp	ucp
Binh-dinh	*267*	*260*	527	Binh-dinh	557	Binh-dinh	557	780				
Binh-thuan	*45*	*41*	86	Binh-thuan	102	Binh-thuan	111	146	135	14	163	12
Darlac	*48*	*50*	98	Darlac	81	Darlac	106	81	79		97	2
Ha-tinh	*196*	*266*	462	Ha-tinh	394	Ha-tinh	400	582				
Haut-Donai	*17*	*19*	36	Haut-Donai	43	Haut-Donai	60	37	65		55	4
Khanh-hoa	*50*	*50*	100	Khanh-hoa	117	Khanh-hoa	121	147	161	4	169	4
Kontum	*103*	*108*	211	Kontum	294	Kontum	362	157	130		73	
Lang-biang	*1*		1									
Nghè-an	*255*	*312*	567	Nghè-an	656	Nghè-an	746	1148				
Phang-rang	*25*	*31*	56	Ninh-thuan	56	Ninh-thuan	86	81	81	1	73	
Phu-yèn	*96*	*88*	184	Phu-yèn	252	Phu-yèn	251	283				
Quang-binh	*92*	*77*	169	Quang-binh	195	Quang-binh	223	255	110	90	111	91
						Pleiku	137	151	166		127	30
Quang-nam	*423*	*383*	806	Quang-nam	691	Quang-nam	767	1002	262	560	261	220
Quang-ngai	*212*	*211*	423	Quang-ngai	344	Quang-ngai	439	550				
Quang-tri	*69*	*75*	144	Quang-tri	153	Quang-tri	172	192	70	96	99	100
Tranh-hoa	*386*	*371*	757	Tranh-hoa	864	Tranh-hoa	844	1127				
Thua-thièn-Hué	*146*	*144*	290	Thua-thièn	291	Thua-thièn	302	407	246		294	140
				Tourane	27	Tourane	25	51	45		57	
Tourane	*8*	*8*	16	Dalat	5	Dalat		5	22		25	
Annam			4933		5122		5656	7182				

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* cp = controlled populations ; ucp = uncontrolled populations ;
M= male ; F= female

Table 3: Population of Cochinchina (by province)

	1895	1921	1921	1921		1931	1936	1946	1952	1952	1953	1953
		M	F	Total					cp	ucp	cp	ucp
Bac-lièu	70	93	86	179	Bac-lièu	231	244	317	110	85	115	182
Baria	34	30	30	60	Baria	58	63	66	30	32	30	30
Ben-tre	195	130	131	261	Ben-tre	285	302	346	335		339	
Biên-hoa	169	66	63	129	Biên-hoa	165	162	202	73	13	108	
Càn-tho	96	162	156	318	Càn-tho	356	367	441	179	162	215	127
Chàu-dòc	93	103	100	203	Chàu-dòc	233	254	273	77	106	76	106
Cho-lon	149	103	103	206	Cho-lon	220	232	279	243	12	250	9
Gia-dinh	178	139	137	276	Gia-dinh	314	298	363	319	50	349	13
Go-còng	64	47	49	96	Go-còng	102	109	119	120	2	123	
Ha-tièn	12	10	8	18	Ha-tièn	26	26	27	10	10	11	10
Long-xuyèn	103	97	97	194	Long-xuyèn	220	253	279	274	30	287	26
My-tho	219	163	164	327	My-tho	380	389	430	319	72	359	46
Rach-gia	37	123	111	234	Rach-gia	338	350	381	57	145	82	10
Sadec	142	102	102	204	Sadec	217	231	260	90	67	156	89
Soc-trang	86	101	94	195	Soc-trang	206	198	244	120	80	131	69
Tàn-an	69	52	53	105	Tàn-an	138	135	159	92	2	108	5
Tay-ninh	49	47	45	92	Tay-ninh	120	122	147	53	128	58	151
Thu-dau-mot	71	67	61	128	Thu-dau-mot	177	173	230	129	44	146	43
Tra-vinh	130	114	113	227	Tra-vinh	249	251	286	152	76	198	44
Vinh-long	139	83	83	166	Vinh-long	183	190	215	140	110	146	100
Poulo-Condore	0.3	2		2	Poulo-Condore	3	3	5	0,5		0,5	
					Cap St Jacques	7	8	9	14		13	
Cholon	112	50	44	94	Cholon	134	145	498	1600		1614	
Saigon	38	46	37	83	Saigon	122	111					
TOTAL	2263			3797		4484	4616	5578	4536		4914	

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Annuaire Statistique de l'Indochine, vol. 11, p. 27
Annuaire Statistique du Vietnam, vol. 2, 1950-1951, p. 23

* cp = controlled populations ; ucp = uncontrolled populations
** Cholon-Saigon from 1943

Table 4 : Population of Tonkin (by province)

	1921	1921	1921	1931	1936		1943		1952	1952	1953	1953
	M	F							cp	ucp	cp	ucp
Bac-giang	105	107	212	255	273	Bac-giang	312	Bac-giang				
Bac-kan	19	17	36	53	54	Bac-kan	70	Bac-kan				
Bac-ninh	187	194	381	453	486	Bac-ninh	543	Bac-ninh	196	92	163	23
Cao-bang	61	63	124	165	171	Cao-bang	231	Cao-bang				
								Gia-làm	186	38	249	63
Hadong	364	391	755	807	904	Hadong	964	Hadong	534		492	286
Ha-giang	34	35	69	60	78	Hai-duong	844	Hai-duong	390		237	15
Hai-duong	283	309	592	813	752	Ha-giang	109	Ha-giang				
Hai-ninh	34	31	65	81	92							
Ha-nam	202	202	404	438	458	Ha-nam	596	Ha-nam	378	90	118	338
Hoa-binh	23	26	49	52	54	Hoa-binh	84	Hoa-binh				
Hung-yèn	186	197	383	360	479	Hung-yèn	533	Hung-yèn	283	203	173	312
Kièn-an	127	130	257	354	418	Kièn-an	429	Kièn-an	289	3	314	40
Lai-chàu	27	26	53	65	67	Lai-chàu	67	Lai-chàu				
Lang-son	51	48	99	130	150	Lang-son	213	Lang-son				
Lao-kay	18	18	36	51	58	Lao-kay	70	Lao-kay				
						Mông-cai	109	Mông-cai				
Nam-dinh	414	412	826	1013	1056	Nam-dinh	1233	Nam-dinh	300		215	190
Ninh-binh	148	153	301	375	387	Ninh-binh	406	Ninh-binh				
								Ninh-giang	343	23	226	131
Phuc-yèn	69	76	145	166	167	Phuc-yèn	202	Phùc-yèn				
Phu-tho	115	126	241	276	296	Phu-tho	352	Phu-tho	66			
Quang-yèn	36	37	73	100	147	Quang-yèn	189	Quang-yèn	117	13	120	11
Son-la	42	44	86	96	103	Son-la	119	Son-la				0,3
Son-tày	116	126	242	272	288	Son-tày	211	Son-tày	235	10	237	0,3
Thai-binh	432	437	869	960	1027	Thai-binh	1139	Thai-binh	357	594	179	761
Thai-nguyèn	35	35	70	83	100	Thai-nguyèn	153	Thai-nguyèn				
Tuyèn-quang	20	20	40	51	65	Tuyèn-quang	84	Tuyèn-quang				
Vinh-yèn	92	102	194	224	244	Vinh-yèn	296	Vinh-yèn *	326		239	
Yèn-bay	29	30	59	76	87	Yèn-bay	108	Yèn-bay				
Haiphong	62	56	118	122	70	Haiphong	65	Haiphong	175		189	
Hanoi	39	36	75	124	149	Hanoi	120	Hanoi	420		461	
Tonkin			6854	8075	8680		9851					

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Annuaire Statistique du Vietnam, vol. 2, p. 25-26
* cp = controlled population ; ucp = uncontrolled population
** Vinh-ph?c-yËn in 1953

Table 5 : Vietnam's population by ethnic group *(1/1000)*

	Annam			Cochinchina			Tonkin		
	1921	1931	1936	1921	1931	1936	1921	1931	1936
European		1	1	3	4	3	1	2	2
Annamite * (Kinh)	899	881	855	853	843	862	886	898	880
Muong	14	14	18				14	10	13
Thai		6	3				70	63	77
Man or Yao and Meo							19	18	19
Indonesian	82	93	117	4	15	11			
Khmer Krom				79	73	71			
Minh-huong				17	16	13			1
Malay and Cham		3	4	2	2	2			
Chinese	2	2	2	41	46	37	5	6	4
Indian and other Asian				1	1	1			
Others	3						5	3	4

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* Vietnamese

Table 6: Catholic population in Viet-Nam in 1929

Eastern Tonkin (Haiphong)	92000
Northern Tonkin (Bac-ninh)	44000
Central Tonkin (Nam-dinh)	327000
Western Tonkin (Hanoi)	163000
Southern Tonkin (Vinh)	144000
Tonkin Highlands (Hung-hoa)	45000
Coastal Tonkin (Phat-diêm)	132000
Eastern Cochinchina (Qui-nhon)	73000
Western Cochinchina (Saigon)	92000
Northern Cochinchina (Hué)	73000

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Table 7: Infant mortality among Vietnamese population in Hanoi (1925-1938)

	birth	death -1 year	death -1 month	death -1 year (for 1000)	death -1 month (for 1000)
1925	2780	1220	490	440	180
1926	3120	1500	590	480	190
1927	2960	1280	470	430	160
1928	3580	1460	440	410	120
1929	3790	1620	510	430	130
1930	3970	1460	440	370	110
1931	4190	1470	500	350	120
1932	4400	1740	400	400	90
1933	5150	1960	460	380	90
1934	5230	1740	390	330	75
1935	4890	1410	170	290	35
1936	4600	1070	110	230	24
1937	4750	1005	160	210	34
1938	4090	766	135	190	33

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Table 8. Births and Stillbirths by sex, Asian population of Cochinchine, 1895-1940

	Male births (thousands)	Female births (thousands)	Male stillbirths (thousands)	Female stillbirths (thousands)	Male/female rate at birth	Stillbirth rate (both sexes)	Stillbirth rate (male only)
1895	35.3	31.9			1.12		
1915	63.1	54.2			1.16		
1919	64.7	54.2			1.19		
1920	63.3	53.1			1.19		
1921	65.4	55.2			1.18		
1922	72.7	62.8			1.16		
1923	71	60			1.18		
1924	76	65			1.17		
1925	77	66			1.17		
1927	79	69			1.14		
1928	80	69			1.16		
1929	84	72			1.17		
1930	89	75			1.17		
1931	83	71			1.17		
1932	83	71			1.17		
1933	83	72			1.15		
1934	93	80	3.2	2.5	1.16	3.7	3.8
1935	89	76	3.4	2.7	1.17	3.8	3.9
1936	92	77	3.3	2.9	1.19	3.7	3.6
1937	94	81	3.4	2.7	1.16	3.5	3.6
1938	95	81	2.7	2.3	1.17	2.8	2.8
1939	103	87	3.1	2.7	1.18	3.1	3.0
1940	106	93	3.7	2.9	1.14	3.3	3.5

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Table 9: Birth and death declared in Cochinchina's Asian population (1895-1937)

	population (1000)	deaths (1000)	death rate (for 1000)	births (1000)	birth rate (for 1000)
1895	2257	50,0	22	70,4	31
1913	3480	69	20	107,1	31
1914	3520	66,7	19	108,3	31
1915	3560	79,3	22	117,3	33
1916	3600	72,1	20	120,4	33
1917	3640	87,2	24	126,4	35
1918	3680	101,2	28	127,7	35
1919	3720	97,4	26	118,9	32
1920	3760	100,3	27	116,4	31
1921	3800	91,6	24	120,6	32
1922	3840	91,2	24	135,5	35
1923	3910	84	21,5	131	33,5
1924	3975	85	21,4	141	35,5
1925	4050	83	20,5	143	35,3
1926	4130	97	23,5	145	35,1
1927	4220	98	23,2	148	35,1
1928	4280	114	26,6	149	34,8
1929	4375	113	25,8	156	35,7
1930	4370	103	23,5	164	37,5
1931	4400	100	22,7	154	35
1932	4400	96	21,8	154	35
1933	4420	99	22,4	156	35,3
1934	4450	105	23,6	173	38,7
1935	4500	114	25,3	165	36,7
1936	4550	110	24,2	169	37,1
1937	4650	113	24,3	175	37,6
1938		104		176	
1939		113		190	
1940		115		199	
1943		147		207	

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Table 10: Birth and death declaration in Vietnam's main cities (1949-1953)

	Births 1949	Deaths 1949	Births 1950	Deaths 1950	Births 1951	Deaths 1951	Births 1952	Deaths 1952	Births 1953	Deaths 1953
Saigon-Cholon	35039	20644	38805	15049	41758	14251	44291	12998	45531	13290
Hué	1563	584	1644	550	2304	715	3428	1223	4537	896
Hanoi	7990	1730	8579	2350	10055	3730	12252	3593	12841	3807
Haiphong	4612	1603	6051	1905	7536	3252	9218	2840	11141	3246

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Table 11: Estimated Population 1884-1989

Estimated Population at Januar 1 of Indicated Years			
	Total Population	Male Population	Female Population
1884	14 009 612	6 868 831	7 140 781
1889	14 685 570	7 200 274	7 485 295
1894	15 396 835	7 549 102	7 847 734
1899	16 146 957	7 917 130	8 229 829
1904	16 944 678	8 308 779	8 635 900
1909	17 802 248	8 730 227	9 072 024
1914	18 733 321	9 188 416	9 544 913
1919	19 472 250	9 550 787	9 921 469
1924	20 556 809	10 087 154	10 469 663
1929	21 885 450	10 745 441	11 140 017
1934	23 416 509	11 505 682	11 910 833
1939	24 486 816	12 036 747	12 450 075
1944	25 486 644	12 535 687	12 950 964
1949	25 915 211	12 744 279	13 170 937
1954	28 557 108	14 071 691	14 485 425
1959	32 490 878	16 052 639	16 438 247
1964	37 046 728	18 351 674	18 695 063
1969	41 246 399	20 261 613	20 984 798
1974	46 582 181	22 722 255	23 859 937
1979	52 961 505	25 950 605	27 010 913
1984	59 881 195	29 453 749	30 427 460
1989	66 980 285	33 050 715	33 929 587

Table 12: Estimated Population by sex and by age group 1884-1909

	Males						Females					
	1884	1889	1894	1899	1904	1909	1884	1889	1894	1899	1904	1909
0-4	1 066 255	1 117 457	1 171 735	1 228 707	1 290 691	1 359 295	1 069 608	1 120 960	1 175 348	1 232 359	1 294 282	1 362 672
5-9	849 919	896 671	939 974	986 171	1 035 095	1 088 920	866 979	914 661	958 777	1 005 744	1 055 340	1 109 709
10-14	781 041	814 635	859 491	901 097	945 561	992 763	793 324	827 448	873 007	915 228	960 268	1 007 962
15-19	712 865	747 013	779 184	822 179	862 142	904 955	719 929	754 417	786 916	830 354	870 709	913 885
20-24	639 134	669 752	701 886	732 226	772 833	810 733	644 176	675 037	707 430	738 028	778 989	817 216
25-29	563 769	590 780	619 139	648 972	677 254	715 193	569 504	596 789	625 439	655 580	684 166	722 522
30-34	491 778	515 341	540 090	566 145	593 657	619 911	498 573	522 462	547 550	573 963	601 852	628 472
35-39	422 536	442 783	464 057	486 472	510 175	535 354	432 126	452 831	474 583	497 495	521 713	547 428
40-44	355 741	372 789	390 710	409 611	429 630	450 948	371 455	389 254	407 956	427 664	448 511	470 677
45-49	292 598	306 621	321 371	336 942	353 462	371 100	316 844	332 027	347 980	364 797	382 595	401 536
50-54	233 199	244 377	256 139	268 571	281 786	295 934	264 815	277 505	290 844	304 910	319 810	335 685
55-59	177 822	186 347	195 324	204 825	214 946	225 818	212 984	223 192	233 929	245 265	257 292	270 138
60-64	127 046	133 138	139 558	146 366	153 639	161 484	160 595	168 294	176 402	184 981	194 112	203 908
65-69	81 907	85 835	89 983	94 393	99 125	104 261	109 901	115 172	120 733	126 636	132 952	139 776
70-74	45 834	48 033	50 360	52 843	55 524	58 458	65 834	68 992	72 332	75 892	79 726	83 906
75-79	20 210	21 181	22 211	23 317	24 522	25 857	31 448	32 958	34 560	36 279	38 147	40 212
80-84	6 233	6 532	6 852	7 200	7 583	8 017	10 822	11 342	11 897	12 497	13 159	13 904
85 +	944	989	1 038	1 093	1 154	1 226	1 864	1 954	2 051	2 157	2 277	2 416

Table 13: Estimated Population by sex and by age group 1914-1939

	Males						Females					
	1914	1919	1924	1929	1934	1939	1914	1919	1924	1929	1934	1939
0-4	1 434 794	1 376 766	1 565 421	1 729 047	1 864 285	1 654 876	1 437 719	1 378 689	1 566 203	1 727 798	1 859 929	1 647 592
5-9	1 149 328	1 217 007	1 172 939	1 341 620	1 493 429	1 626 110	1 170 455	1 238 128	1 191 613	1 360 382	1 510 545	1 639 606
10-14	1 044 849	1 103 516	1 169 543	1 128 572	1 292 967	1 442 266	1 060 426	1 119 290	1 185 217	1 142 283	1 306 483	1 454 147
15-19	950 556	1 001 074	1 058 243	1 122 952	1 085 396	1 246 130	959 787	1 010 521	1 067 768	1 132 331	1 093 452	1 253 779
20-24	851 521	895 230	943 992	999 613	1 063 152	1 030 598	858 317	902 304	951 296	1 007 060	1 070 591	1 037 109
25-29	750 864	789 546	831 412	878 628	933 113	996 139	758 581	797 648	839 876	887 424	942 183	1 005 365
30-34	655 242	688 839	725 678	766 105	812 348	866 460	664 301	698 356	735 652	776 515	823 168	877 638
35-39	559 634	592 452	624 192	659 537	699 033	744 983	572 209	605 698	638 030	673 950	713 975	760 400
40-44	473 807	496 207	526 661	556 830	591 102	630 240	494 398	517 567	549 028	580 021	615 042	654 793
45-49	390 084	410 724	431 415	459 741	488 673	522 297	421 837	443 788	465 601	495 379	525 413	559 960
50-54	311 224	327 938	346 464	365 603	391 995	419 929	352 732	371 213	391 489	412 107	440 408	469 764
55-59	237 623	250 608	265 115	281 604	299 283	323 816	283 978	299 051	315 684	334 317	353 869	380 846
60-64	170 051	179 546	190 255	202 567	217 001	233 133	214 523	226 173	239 154	253 866	270 836	289 382
65-69	109 917	116 252	123 491	131 940	142 013	154 249	147 238	155 525	164 891	175 687	188 373	203 546
70-74	61 723	65 430	69 736	74 855	81 080	88 800	88 532	93 746	99 746	106 802	115 282	125 660
75-79	27 367	29 115	31 191	33 720	36 876	40 894	42 537	45 212	48 366	52 176	56 886	62 819
80-84	8 519	9 117	9 849	10 771	11 961	13 526	14 762	15 777	17 010	18 549	20 516	23 078
85 +	1 313	1 420	1 557	1 736	1 975	2 301	2 581	2 783	3 039	3 370	3 882	4 591

Table 14: Estimated Population by sex and by age group 1944-1969

	Males						Females					
	1944	1949	1954	1959	1964	1969	1944	1949	1954	1959	1964	1969
0-4	1 590 677	1 702 843	2 300 694	2 977 562	3 309 906	3 430 340	1 579 633	1 695 420	2 270 120	2 927 397	3 242 345	3 342 677
5-9	1 460 643	1 370 835	1 546 169	2 120 722	2 784 685	3 148 076	1 467 235	1 375 900	1 547 940	2 101 152	2 746 108	3 089 128
10-14	1 574 434	1 392 187	1 335 774	1 511 972	2 081 104	2 743 743	1 583 018	1 394 195	1 338 132	1 511 549	2 059 980	2 704 356
15-19	1 393 648	1 499 433	1 354 031	1 303 870	1 481 158	1 962 488	1 399 819	1 508 570	1 352 522	1 303 722	1 478 958	2 022 227
20-24	1 187 482	1 304 104	1 441 733	1 308 424	1 266 178	1 320 185	1 193 825	1 320 030	1 450 457	1 307 449	1 267 015	1 441 046
25-29	970 092	1 092 328	1 241 670	1 381 439	1 261 585	1 121 289	978 411	1 109 543	1 259 632	1 392 881	1 263 430	1 228 396
30-34	929 920	884 007	1 033 284	1 183 174	1 325 901	1 137 007	941 345	897 188	1 052 313	1 203 179	1 339 824	1 216 729
35-39	799 565	836 099	828 437	976 615	1 127 723	1 218 578	815 372	850 333	845 462	999 460	1 151 637	1 280 812
40-44	676 600	703 459	773 231	773 835	921 266	1 026 858	701 618	727 502	796 501	798 550	951 775	1 095 850
45-49	561 557	579 553	639 885	711 392	719 952	842 226	599 868	617 347	676 824	747 345	755 574	896 195
50-54	453 142	465 252	514 841	575 861	648 430	658 710	504 153	515 666	565 502	625 920	697 660	699 110
55-59	350 773	357 862	399 412	448 652	509 249	576 505	409 763	414 857	459 525	509 899	570 947	631 847
60-64	255 606	255 879	291 811	331 524	378 919	435 230	315 052	315 653	353 063	397 208	447 529	499 883
65-69	168 532	164 176	192 732	224 750	260 940	304 627	220 898	219 440	250 301	285 820	328 116	370 907
70-74	98 508	89 607	110 349	133 161	159 486	189 967	138 532	130 016	156 806	183 627	215 114	248 598
75-79	46 079	37 196	49 779	63 569	79 443	98 334	70 389	59 915	77 811	97 215	117 781	139 571
80-84	15 611	9 381	15 593	21 910	29 299	38 188	26 456	17 983	27 554	37 463	48 882	60 377
85-89	2 787	78	2 262	4 060	6 115	8 673	5 405	1 379	4 865	7 996	11 579	15 753
90 +	31		4	147	335	589	172		95	415	809	1 336

Table 15: Estimated Population by sex and by age group 1974-1989

	Males				Females			
	1974	1979	1984	1989	1974	1979	1984	1989
0-4	3 995 302	4 316 909	4 634 233	4 781 986	3 879 734	4 183 490	4 482 642	4 617 511
5-9	3 305 487	3 857 453	4 208 622	4 547 226	3 230 326	3 763 625	4 090 976	4 410 784
10-14	3 111 962	3 249 998	3 799 769	4 164 443	3 054 366	3 183 462	3 717 392	4 053 222
15-19	2 596 242	3 052 835	3 195 523	3 741 569	2 666 366	3 003 674	3 139 411	3 672 683
20-24	1 758 112	2 529 290	2 986 208	3 133 098	1 981 629	2 609 352	2 950 201	3 091 735
25-29	1 176 771	1 707 590	2 462 490	2 918 732	1 406 517	1 931 326	2 553 180	2 896 081
30-34	1 018 109	1 135 186	1 660 748	2 399 311	1 191 719	1 362 248	1 883 759	2 498 557
35-39	1 053 691	984 877	1 094 837	1 614 280	1 172 329	1 156 948	1 319 934	1 836 989
40-44	1 120 236	1 012 615	950 717	1 052 683	1 228 582	1 133 207	1 123 001	1 277 227
45-49	948 641	1 069 411	967 861	912 016	1 040 071	1 184 278	1 092 989	1 086 543
50-54	779 333	889 840	1 010 128	914 307	836 465	990 794	1 134 313	1 046 552
55-59	593 127	713 662	819 216	935 649	639 849	783 743	932 551	1 073 030
60-64	500 050	521 574	633 531	730 354	560 778	581 499	718 469	858 530
65-69	356 275	414 724	436 303	534 741	421 650	486 327	508 162	633 282
70-74	226 681	269 260	317 799	336 679	287 240	337 059	394 027	414 388
75-79	120 474	146 504	177 202	212 021	165 940	199 131	237 849	281 784
80-84	48 972	61 715	76 163	93 758	74 065	92 170	112 097	136 108
85-89	11 859	15 787	20 465	25 253	20 339	25 961	33 060	40 099
90 +	931	1 375	1 934	2 609	1 972	2 619	3 447	4 482